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MEMORANDUM

October 4, 1991

To: City Planning Commissioners

From: Barbara W. Sahm, Environmental Review Officer

Re: Background Information on the San Francisco International Airport Master Plan Draft EIR

Attached is a package of materials in response to requests made by Commissioners at the August 29 public hearing on the SFIA Master Plan DEIR. The package includes a brief discussion and explanation of some of the information in the attached documents, with the documents identified as "Attachment X".

Attachment A is the 1990 Air Passenger Survey prepared by MTC, released for public use in August 1991. It covers passengers arriving at the three major Bay Area airports. As noted in the discussion, it was not used in the Draft EIR because it was not available until after the Draft was published. The Draft EIR explains the surveys used, as well as the assumptions and methodology that formed the project passenger and employee trip distribution on pages 287 - 292.

The discussion that precedes the attachments also summarizes the Airport's information on proportion of flights heading generally for international, domestic and Southern California destinations. The MTC 1990 Passenger Survey also provides some limited information on links between the passenger survey information (where people are coming from to get to the airport) with the flight destination information (where people who use the airport are going).

Attachment B includes portions of the work, now in progress, on the Regional Airport System Plan. It is being prepared under contract by TRA Airport Consulting for MTC. The Plan Update, originally expected in 1991, is now expected to be complete sometime in late 1992. So far, the material that is available to the public includes information on preliminary forecasts of growth at the various regional airports, an inventory of present facilities and their

capacities, and a draft discussion of alternative regional planning scenarios. The preliminary aviation demand forecasts were not used in the Draft EIR on the SFIA Master Plan because they were not finalized at the time the Draft EIR was published, and are not yet finalized for use. The Draft EIR does include summaries of activity levels for the San Francisco Airport as forecast by the Caltrans Division of Aeronautics (CASP) and the Federal Aviation Administration (FAA), in addition to growth estimated by SFIA consultants preparing the draft Master Plan, on pages 61 - 72. Attachment B includes the draft forecasts of growth at Oakland and San Jose Airports.

Attachment C is additional information on the status of San Jose Airport expansion plans.

Attachment D is a brief explanation of airport operations and the regulatory framework for airport operations, prepared at my request by ESA. While this information was not specifically requested, it seemed useful in the context of the SFIA Master Plan EIR. It is information generally known and obvious to those who run airports, but is a useful summary for those of us who simply use airports. It includes information on the extent that the local operator can control airport activities and a brief discussion of airport economics. An appendix summarizing Federal regulatory history is also provided.

Attachment E includes copies of letters of comment on the Draft EIR by regional agencies--MTC, ABAG and Caltrans Division of Aeronautics. These agencies, and many nearby cities and counties have been very cooperative in submitting their letters of comment as close to the original end of comment period of September 10.

I hope this information will be useful to the Commission in completing its comments on the Draft EIR on the SFIA Master Plan. The EIR files include other documents, such as relevant portions of General Plans from cities surrounding the Airport, that can be made available to the Commission upon request. If you have any questions about the attached materials in the package or about material referenced in the DEIR, please call me. My number is 558-6378.

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Background Information

MTC 1990 SURVEY

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INTRODUCTION

The *SFIA Master Plan Draft EIR* traffic analysis made use of several surveys that have been conducted in the past decade. The Metropolitan Transportation Commission (MTC) conducts a comprehensive survey of air passengers at the three Bay Area airports every five years./1/ The City and County of San Francisco Airports Commission conducts an annual survey at SFIA each May. The most recent survey of San Francisco International Airport (SFIA or SFO) employees is the San Mateo County Transit (SamTrans) *SFO Airport Employee/Employer Survey. September 1983.*

MTC's *1990 Air Passenger Survey* results were released in August 1991, and were not available for use in the *SFIA Master Plan Draft EIR.*

In the *SFIA Master Plan Draft EIR*, the trip distribution analysis for project-related traffic was based on survey data. Project trip distribution assumptions, methodology, and estimates are outlined on pages 287-292 of the Draft EIR. The 1983 SamTrans survey was used for the distribution of SFIA employees. The 1989 San Francisco Airports Commission survey was used for the air passenger distribution. (This methodology implies that the distribution of passenger origins will not change significantly in the future.) Use of these surveys provided the most conservative estimate of project-generated traffic, as the surveys showed the highest percentage of automobile use. The analysis for the Draft EIR included a comparison of both of the surveys to other MTC and San Francisco Airports Commission surveys, in addition to the MTC 700-zone Bay Area multi-purpose trip model. The trip distribution data that were used were found to be consistent with the MTC model.

Further survey data were collected by DKS Associates in the summer of 1990, to obtain vehicle classification information. The survey covered automobiles (single-occupant and carpools), shuttles, buses, taxis and limousines. The vehicle occupancy data were used to convert air passenger trips to vehicle trips; traffic analysis is based typically on vehicle trips.

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The entire MTC *1990 Air Passenger Survey* is presented in Attachment A. A summary of the survey results is presented on pages 17 through 22 of the survey.

COMPARISON OF MTC 1990 AIR PASSENGER SURVEY WITH SFIA MASTER PLAN DRAFT EIR

Comparisons of the recently released MTC *1990 Air Passenger Survey* (August 1991) with the surveys used in the *SFIA Master Plan Draft EIR* traffic analysis and DKS estimates of resulting person trips are shown in Tables 1, 2 and 3 on the following three pages. The MTC 1985 and 1990 surveys are internally similar with respect to the origins of air passengers in the Bay Area. The 1989 San Francisco Airports Commission survey, however, shows more people arriving from Alameda, Contra Costa, Marin, Napa, San Francisco and Sonoma counties, and fewer people arriving from San Mateo, Santa Clara and Solano Counties, than the MTC survey does. The largest differentials (MTC results first, Airports Commission second) are for air passengers coming from Santa Clara (21 percent versus 8 percent) and Marin (4 percent versus 13 percent).

The MTC surveys are also internally similar with respect to mode choices, with a decrease in taxi use and an increase in airport shuttle use between 1985 and 1990. The 1989 San Francisco Airports Commission survey, however, shows a higher percentage in the use of both private automobiles and public transit, and a lower percentage in the use of rental cars and airport shuttles, than the MTC surveys.

If the trip distribution patterns for the proposed SFIA Master Plan were recalculated using the MTC *1990 Air Passenger Survey*, which shows a relatively higher percentage of trips coming from San Mateo and Santa Clara Counties, increased impacts could be experienced on U.S. Highway 101 and U.S. Interstate 280 (I-280), particularly south of SFIA. The number of trips affected are shown in Tables 1 and 2, for the a.m. and p.m. peak hours, respectively.

The number of project-generated trips to and from Santa Clara County would be 21.5 percent of the total project-generated trips if the MTC *1990 Air Passenger Survey* data were used, as compared to the 8 percent figure used in the *SFIA Master Plan Draft EIR* (San Mateo County trips would be 14.5 percent of the total, as compared to the Draft EIR's 12.0 percent). The difference of 400 or 500 vehicles during each peak

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TABLE 1: ORIGINS OF AIR PASSEN

County	1985 Percent Passengers					06 son ps/a/	1989 SFIA Survey Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/
Alameda	13.6%					35	19.0%	310	537
Contra Costa	6.7%					04	11.0%	180	311
Marin	5.2%	83	147	4.6%	75	130	13.0%	212	368
Napa	0.7%	11	20	1.4%	23	40	2.0%	33	57
San Francisco	30.4%	496	859	28.0%	457	792	31.0%	506	876
San Mateo	14.0%	228	396	14.5%	237	410	12.0%	196	339
Santa Clara	18.0%	294	509	21.5%	351	608	8.0%	131	226
Solano	1.3%	21	37	2.1%	34	59	0.5%	8	14
Sonoma	2.5%	41	71	2.7%	44	76	4.0%	65	113
Out of Region	7.6%	124	215	2.4%	39	68	n/a	0	0

NOTES:

Airport employees were not surveyed by either MTC or SFIA.
Totals may not add to 100% due to rounding.

/a/ DKS calculation of distribution of SFIA Master Plan-generated trips, based on air passenger survey figures.

SOURCE: DKS Associates, 1991

[San Francisco International Airport 1991]
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The entire MTC *1990 Air Passenger Survey* is presented in Attachment A. A summary of the survey results is presented on pages 17 through 22 of the survey.

COMPARISON OF MTC 1990 AIR PASSENGER SURVEY WITH SFIA MASTER PLAN DRAFT EIR

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TABLE 1: ORIGINS OF AIR PASSENGERS - AM PEAK HOUR

County	1985 MTC Survey Percent Passengers	1985 MTC Survey 1996 Person Trips/a/	1985 MTC Survey 2006 Person Trips/a/	1990 MTC Survey Percent Passengers	1990 MTC Survey 1996 Person Trips/a/	1990 MTC Survey 2006 Person Trips/a/	1989 SFIA Survey Percent Passengers	1989 SFIA Survey 1996 Person Trips/a/	1989 SFIA Survey 2006 Person Trips/a/
Alameda	13.6%	222	384	15.4%	251	435	19.0%	310	537
Contra Costa	6.7%	109	189	7.2%	118	204	11.0%	180	311
Marin	5.2%	85	147	4.6%	75	130	13.0%	212	368
Napa	0.7%	11	20	1.4%	23	40	2.0%	33	57
San Francisco	30.4%	496	859	28.0%	457	792	31.0%	506	876
San Mateo	14.0%	228	396	14.5%	237	410	12.0%	196	339
Santa Clara	18.0%	294	509	21.5%	351	608	8.0%	131	226
Solano	1.3%	21	37	2.1%	34	59	0.5%	8	14
Sonoma	2.5%	41	71	2.7%	44	76	4.0%	65	113
Out of Region	7.6%	124	215	2.4%	39	68	n/a	0	0

NOTES:

Airport employees were not surveyed by either MTC or SFIA.
Totals may not add to 100% due to rounding.

/a/ DKS calculation of distribution of SFIA Master Plan-generated trips, based on air passenger survey figures.

SOURCE: DKS Associates, 1991

[San Francisco International Airport 1991]
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TABLE 2: ORIGINS OF AIR PASSENGERS - PM PEAK HOUR

County	1985 MTC Survey			1990 MTC Survey			1989 SFIA Survey		
	Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/	Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/	Percent Passengers	1996 Person Trips/a/	2006 Person Trips/a/
Alameda	13.6%	241	418	15.4%	273	473	19.0%	337	584
Contra Costa	6.7%	119	206	7.2%	128	221	11.0%	195	338
Marin	5.2%	92	160	4.6%	82	141	13.0%	230	399
Napa	0.7%	12	22	1.4%	25	43	2.0%	35	61
San Francisco	30.4%	539	934	28.0%	496	860	31.0%	549	953
San Mateo	14.0%	248	430	14.5%	257	446	12.0%	213	369
Santa Clara	18.0%	319	553	21.5%	381	661	8.0%	142	246
Solano	1.3%	23	40	2.1%	37	65	0.5%	9	15
Sonoma	2.5%	44	77	2.7%	48	83	4.0%	71	123
Out of Region	7.6%	135	234	2.4%	43	74	n/a	0	0

NOTES:

Airport employees were not surveyed by either MTC or SFIA.
Totals may not add to 100% due to rounding.

/a/ DKS calculation of disribution of SFIA Master Plan-related trips, based on air passenger survey figures.

SOURCE: DKS Associates, 1991

TABLE 3: COMPARISON OF AIR PASSENGER SURVEYS: GROUND TRANSPORTATION MODES

	1985 MTC Survey	1990 MTC Survey	1989 SFIA Survey
Private Car	47.1%	46.0%	49.4%
Rental Car	19.5%	19.6%	13.6%
Hotel Shuttle	5.8%	4.0%	9.9%
Public Transit	0.9%	1.2%	6.2%
Taxi	10.8%	6.1%	8.6%
Luxury Limo	2.3%	2.6%	2.5%
Airporter/Other	13.6%	20.5%	9.9%
TOTAL	100.0%	100.0%	100.0%

NOTE: Airport employees were not surveyed by either MTC or SFIA. Totals may not add to 100 percent because of rounding.

SOURCE: DKS Associates, 1991

hour, if spread evenly over the 16 total lanes of U.S. 101 and I-280 between Santa Clara County and the Airport, would add about 1 car to each lane every 2.0 to 2.5 minutes, a statistically insignificant addition. These trips had been assigned to other parts of the Bay Area for the *SFIA Master Plan Draft EIR* traffic analysis; recalculation of the trip distribution using the MTC *1990 Air Passenger Survey* data would therefore result in a correspondingly slight reduction in impacts to those other areas.

Overall, the calculated intersection levels of service would not be expected to differ, and the freeway segments and ramps north of SFIA would probably not experience better levels of service as a result of the use of MTC *1990 Air Passenger Survey* data. As noted above, the freeway mainline segments on U.S. 101 and I-280 south of SFIA would have slightly more traffic, and as a result, the volume-to-capacity ratios would most likely increase, but not in a statistically significant way, relative to estimates in the *SFIA Master Plan Draft EIR* traffic analysis. This would not change the overall conclusions of the latter study; therefore, the mitigation measures identified would still be applicable and no new mitigation measures would be necessary.

PASSENGER DESTINATIONS

According to SFIA staff, 86.7 percent of total passengers using SFIA in 1990 had domestic destinations, and 13.3 percent had international destinations. Of the total passengers, 21.3 percent had Southern California destinations (Los Angeles, San Diego, Santa Barbara, and Palm Springs)./2/

The MTC *1990 Passenger Survey* provides limited information on the link between passenger origins and destinations. Table 2.10 on page 34 of the survey shows that about 70 percent of SFIA passengers had "domestic and international" destinations, and about 30 percent had California destinations. Of the SFIA passengers with domestic and international destinations, about 34 percent were from San Francisco, 19 percent from San Mateo County, 13 percent from Santa Clara County, and 12 percent from Alameda County (the remaining 22 percent were from other Bay Area counties and outside the region). Of the SFIA passengers with California destinations, about 47 percent were from San Francisco, 20 percent from San Mateo County, 9 percent from Santa Clara County, and 7 percent from Alameda County./1/

About 56 percent of Metropolitan Oakland International Airport passengers had California destinations, and about 44 percent had domestic and international destinations. Of the passengers with California destinations, about 42 percent were from Alameda County. Of the passengers with domestic and international destinations, about 53 percent were from Alameda County./1/

About 54 percent of San Jose International Airport passengers had domestic and international destinations, and about 46 percent had California destinations. About 82 to 83 percent of passengers (regardless of destination) were from Santa Clara County./1/

Table 9.1 on page 85 of the survey shows that about 36 percent of total Bay Area passengers had California destinations; about 59 percent had domestic destinations; and about 5 percent had international destinations. The percentages were roughly the same for each Bay Area county./1/

NOTES - MTC 1990 Survey

/1/ Metropolitan Transportation Commission, *1990 Air Passenger Survey*, August 1991.

/2/ John Costas, Assistant Administrator, San Francisco International Airport, telephone conversation, October 2, 1991.

COMPONENTS AND STATUS OF THE RASP

The Regional Airport Planning Committee (RAPC) advises the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission (MTC) on aviation matters and is preparing the *MTC Regional Airport System Plan* (RASP) Update with MTC staff and Seattle-based TRA Airport Consulting. (The recently published *1990 Air Passenger Survey*, summarized above, was also prepared under RAPC auspices.)/1/ The updated RASP is expected to be completed in 1992./2,3/ The RASP and 1980 *Regional Airport Plan* are discussed on pages 108 through 110 of the Draft EIR.

The RAPC has 13 members representing ABAG, the Bay Area Council, the Bay Conservation and Development Commission (BCDC), Buchanan Field (Concord), Caltrans Division of Aeronautics, the Federal Aviation Administration (FAA), MTC, the Port of Oakland (Metropolitan Oakland International Airport), San Francisco International Airport, San Jose International Airport, and selected Bay Area cities and counties./1/ The RAPC has been meeting quarterly during the RASP Update preparation process; the most recent meeting was September 6, 1991.

The previous Metropolitan Transportation Commission *Regional Airport Plan* was completed in 1980. The update currently in progress is intended to include an inventory, forecasts of aviation demand, a definition of alternatives, an evaluation of alternatives, an EIR, and revisions to the system plan./4/

Elements of the RASP that have been completed to date include drafts of Chapter IV, "Inventory and Capability Assessment," and Chapter VII, "Airport System Alternatives Definition." The Aviation Demand Forecasts element has not been completed because the forecasts are being refined; air carrier and general aviation forecasts are expected to be completed in December 1991. (Selected preliminary forecasts are illustrated in Attachment B, along with the inventory and alternatives draft chapters of the RASP Update.) As of September 1991, the Evaluation of Alternatives element was in progress.

SUMMARY OF RASP INVENTORY AND CAPABILITY ASSESSMENT

The RASP Draft Inventory and Capability Assessment documents the existing physical, operational, environmental, and policy conditions for each airport in the system, and for the system as a whole. In addition, the chapter presents information on the constraints and capabilities of the airports and the airport system. These constraints and capabilities directly affect the system's ability to meet current and future aviation demand in the region./4/

Inventory

The inventory includes all public use and military airports in the region (see MTC Exhibit 4.1 on page 4, Chapter IV in Attachment B). Private airfields are included in less detail because less information is available about private-use facilities. The inventory also contains information about public-use airports that have been closed completely, and military airfields that are inactive (closed to military operations but still able to be used), such as Hamilton Field. Although currently closed, these facilities are important aviation resources that should be considered in planning for the regional aviation system./4/

The regional airport system includes some 25 public-use civil airports, four military airports, and 20 private-use facilities (three of which are closed). The commercial service airports in the region include San Francisco International, Metropolitan Oakland International, San Jose International, Buchanan Field (Concord), and Sonoma County Airport./4/

Many changes have occurred since the last MTC Regional Airport Plan revision in 1980. The number of facilities has increased. Some have shifted in type of ownership and category of use. Since 1980, two additional commercial service airports have commenced scheduled passenger service: Sonoma County and Buchanan Field./4/

MTC Exhibit 4.23 (pages 51 through 54, Chapter IV in Attachment B) summarizes the inventory of Bay Area public-use airports.

Capability Assessment

The RASP capability assessment includes a comparison of airports' existing capacity with their existing levels of demand, and an analysis of potential constraints on future activity at each airport.

Capacity and Demand

The comparison of runway capacity with demand found that "The commercial service airports are constrained considerably in the peak hour. Demand for runway access exceeds capacity in IFR [poor weather] conditions."/4/ (MTC Exhibit 4.23 in Attachment B shows the percentage of annual runway capacity currently used at each airport.) The comparison of "landside" (including passenger terminal) capacity with demand found that:

- San Jose International Airport "...has a terminal capacity shortfall";
- SFIA "...has insufficient domestic and international terminal capacity"; and
- Oakland International Airport "...has an adequate terminal capacity availability."/4/

Constraints

The analysis of constraints notes that "There are additional factors beyond the airports' physical capacity...which place limitations on how much activity can and will take place at each airport." The constraints are categorized as airspace-, environmental-, physical-, and policy-related./4/

Airspace constraints "...relate to regional airspace issues." The airspace used by the Bay Area airports overlaps, and procedures are in place where flights from one airport "interact" with (operate in the same airspace as) flights from another airport. Because SFIA has the largest share of the region's air traffic, SFIA has been established at the top of the "user's hierarchy." This designation means that the operations of other airports in the region (in the airspace) must conform with the operations at SFIA./4/

Environmental constraints are those related to the natural environment, such as wildlife, wetlands, and San Francisco Bay.

> "Two of the major commercial airports, Oakland and San Francisco, are situated on the Bay, and host a variety of wildlife. Development at Oakland is also affected by the presence of non-Bay wetland areas. Wetlands exist to a lesser degree at other airports as well. Construction of new runways which affect wetlands or require Bay fill will not meet with general favor. Public opposition to capacity increasing measures may be strong and well organized."/4/

Physical constraints include such things as "limited airport size or the presence of physical barriers to growth." The constraints analysis notes that SFIA "is constrained by the absence of sufficient land area for a new runway and passenger terminal development," but has undeveloped parcels that could accommodate support facilities. Metropolitan Oakland International Airport "has considerable land area" for development, but also has "significant areas of environmentally sensitive property." Future development at San Jose International Airport is "highly constrained," given the airport's location and small site./4/

Policy constraints "...include noise, safety, and other community compatibility issues." The constraints analysis notes that noise regulations are in place at SFIA, Metropolitan Oakland International Airport, and San Jose International Airport. San Jose International Airport has a curfew on all operations from 11:30 p.m. to 6:30 a.m.:

> "This limits the total daily activity which can occur at the airport, and also creates some congestion during the morning hours. If continued into the future, the curfew will constrain activity at the airport and cause increased congestion within the available operating time envelope."/4/

The RASP Inventory and Capability Assessment includes further discussion of the constraints on future development at the airports in the region (see pages 37 through 44, Chapter IV in Attachment B).

DEFINITION OF AIRPORT SYSTEM ALTERNATIVES

As noted above, one of the elements of the RASP that has been completed is the Airport System Alternatives Definition, included in Attachment B to this packet.

The RASP Air Carrier System Alternatives include:

- No New Action
- Airport System Management (ASM)
- Airport Master Plans
- Airport System Optimization
- New Technology/4/

Implications of each of the System Alternatives are also identified in the RASP Airport System Alternatives Definition. "Implications" are defined as areas that could be affected by the implementation of an alternative. The following implications will be addressed in the RASP evaluation of alternatives:

- Runway/airspace congestion and delay
- Airport ground access constraints
- Environmental impacts
- Air Fares (supply vs demand) / Airline Competition
- Safety
- Timing of improvements and other actions
- Airport / airline cooperation
- Joint use agreements with the military
- Public transportation improvements to airports
- Funding
- Impacts on general aviation
- Operating agencies
- Potential markets / practical application
- Noise / land use compatibility / encroachment protection
- Passenger convenience/4/

The evaluation of the Regional Airport System Alternatives, and selection of a preferred plan, will take into consideration such factors as the relationship between capacities, demand forecasts, and efficiency (delays); the distribution of demand and supply; environmental effects (bay or wetland fill, noise, air quality); economic benefits; construction costs; ground access and public transportation; safety and emergency response; and the ability of MTC to implement./4/ As noted above, criteria for evaluating the System Alternatives are still being refined./2,3/

RASP LIMITATIONS

When complete, the *MTC Regional Airport System Plan* (RASP) Update will provide a body of information on the existing regional system and its operations, expected future requirements, and recommendations for accommodating those future requirements. This information can be used by decisionmakers within the region, including the airports themselves, in guiding capital improvement programs and related policy decisions./3/

No regional authority currently exists to enforce the RASP. MTC's authority to implement elements of the RASP is generally indirect, in that MTC has responsibility for environmental review and funding approval on regional ground transportation projects. MTC can thus potentially influence airport planning through its role in major ground transportation projects affecting specific airports. MTC and the RASP can also potentially influence other agencies that affect regional airport systems (e.g., FAA, airlines, airports, U.S. military). Implementation of a majority of RASP elements, however, depends on voluntary actions by the airports and airlines.

Other large metropolitan regions, such as Los Angeles and New York, conduct planning for multiple airport development within the auspices of a municipal or regional agency or authority which has decision-making power over several airports within the region. Attachment D of this packet contains a discussion of the ability of airport operators to influence airline service and air travel demand.

The level of detail in the final RASP, moreover, will likely be at a programmatic level, rather than a project-specific level. Cooperation by the airports with the RASP would therefore not eliminate the need for development of individual airport Master Plans.

NOTES - MTC Regional Airport System Plan Update

/1/ Metropolitan Transportation Commission, *1990 Air Passenger Survey*, August 1991.

/2/ Marc Roddin, Metropolitan Transportation Commission Staff Liaison, telephone conversation, September 16, 1991.

/3/ Steve Kiehl, TRA Airport Consulting, telephone conversation, September 16, 1991.

/4/ TRA Airport Consulting, *MTC Regional Airport System Plan, Draft Inventory and Alternatives Definition*, May 1991.

SUMMARY AND STATUS OF METROPOLITAN OAKLAND INTERNATIONAL AIRPORT (MOIA) MASTER PLAN

The Port of Oakland is proceeding with plans to match existing landside capacity with existing airside capacity as part of its Terminal Expansion Program. Minor airside improvements, such as a taxiway bypass, are also being explored as part of that plan. The MOIA Master Plan is currently being re-evaluated by the Port of Oakland. While the MOIA Master Plan calls for expansion of airside capacity, some of the components of the Plan may be delayed until more studies on the Airport's capacity are completed. Constraints facing the Port are discussed briefly above, in the summary of the Inventory and Capabilities section of the *Draft MTC Regional Airport Plan Inventory and Definition of Alternatives* (TRA Airport Consulting, May 1991). According to that document:

> "Oakland's plans involve meeting growth in air carrier operations by improving airside capacity and acting on many landside improvements. The air cargo market is important to them as is the general aviation market. Plans include:
>
> - Construct new air carrier runway with parallel taxiway
> - Expand terminal to 42 gates
> - Construct parking garage
> - Terminal roadway improvements
> - Develop additional 100 acres for air cargo
> - Develop expanded GA apron and tie-downs
> - Construct new ARFF facility
> - Construct new international arrivals facility
> - Construct BART connection."/1/

SUMMARY AND STATUS OF SAN JOSE INTERNATIONAL AIRPORT MASTER PLAN

Constraints on expansion of San Jose International Airport are discussed briefly above, in the summary of the Inventory and Capabilities section of the *Draft MTC Regional Airport Plan Inventory and Definition of Alternatives* (TRA Airport Consulting, May 1991). According to that document:

> "Future plans at San Jose International include work on both the air side and land side of the airport. Their master plan should be completed by mid-1991.

Airfield

- Extend runway 12L-30R to 8,900 feet (included in previously adopted master plan)
- Reworking of the taxiways
- Pavement management rehabilitation work on the airfield.

Terminal

- Reconstruction of passenger terminal C and construction of new passenger terminal B
- Construction of a new air traffic control tower.

Parking

- Construct new parking garages.

General Aviation

- Relocation of all GA to west side of airport
- Reduce total number of GA based aircraft.

Air Freight

- New air cargo facilities.

Other

- Installation of a fuel farm.

Roadway

- Terminal area roadway improvements."/1/

The master plan process for San Jose International Airport has been extended by at least two years, in order to respond to the direction of the San Jose City Council. (The process would now be complete or nearly complete under the original schedule.)/2/

Through the master plan process, begun in 1988, San Jose International Airport and its consultants developed a range of development alternatives and selected a preferred plan. In January 1991, the Airport took the plan to the San Jose City Council. After a series of contentious public meetings, the City Council (in May 1991) decided not to endorse any of the master plan alternatives. The Council directed the Airport to address a specific list of additional issues and develop three or four master plan alternatives incorporating those issues./2/

The San Jose City Council has directed the Airport to begin work on the master plan EIR, which is to address all of the master plan alternatives in equal detail. A preferred plan will then be selected, incorporating the results of the environmental review. It is expected that this process will take about two years to complete./2/

A memorandum from the San Jose Director of Aviation to the City Council outlining the current master plan work program is included in Attachment C.

DEVELOPMENT PLANS FOR HAMILTON AIR FORCE BASE

The *Draft MTC Regional Airport Plan Inventory and Definition of Alternatives* contains the following background information on Hamilton Air Force Base:

> "Hamilton Field, formerly Hamilton Air Force Base, is owned and operated by the United States Army, but currently accommodates some activity by the U.S. Coast Guard Strike Team. This unit is on call for emergencies and uses the airfield as required. They do not base any aircraft here. The U.S. military currently uses housing at the field for personnel from all branches and from the U.S. Coast Guard. A single, 8,000 foot runway is located on the site, with no air traffic control tower. Roadway access to the base is facilitated by nearby State [sic] Highway 101 and local bus service to the main gate by the Golden Gate Transit Company.
>
> "Many groups have interest in the future of Hamilton Field as it is also in a well developed area of the region, located in Marin County. Hamilton Field has property which includes many wetland areas, and as redevelopment of the land is considered, their preservation may be a prominent concern. The land is valuable and there is possible pressure to sell the land for other development. If there is a rise in the number of flights, there is a potential for neighborhood objection to noise levels."/1/

According to Mr. Charles Gallagher, head of the Hamilton Re-Use Committee, Hamilton Field could function as a regional airport for the North Bay without becoming an air carrier airport. The Hamilton Re-Use Committee will present a plan based on this concept to the public in the Fall of 1991./3/ Certification by the FAA of Hamilton Field as a Part 139 airport would allow only smaller commuter aircraft (up to 30 seats) to operate out of Hamilton. These commuter craft could potentially serve as feeders for the American Airlines hub at San Jose International Airport. Other potential reliever airports include Travis Air Force Base in Napa County (joint military-civilian use is proposed) and Moffett Field in Santa Clara County./3/

On September 12, a development team submitted plans to the City of Novato to build 1,400 homes and as much as 1.2 million square feet of commercial space at Hamilton Field. The project would be developed on about 350 acres at the base./4/

NOTES - Development Plans of Selected Bay Area Airports

/1/ TRA Airport Consulting, *MTC Regional Airport System Plan, Draft Inventory and Alternatives Definition*, May 1991.

/2/ Cary Greene, Airport Planner, San Jose International Airport, telephone conversation, September 25, 1991.

/3/ Charles Gallagher, Hamilton Re-Use Committee, telephone conversation, September 19, 1991.

/4/ "Developer's Big Plans For Novato," article in *San Francisco Chronicle*, September 11, 1991.

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ttachment A

ATTACHMENT A
1990 AIR PASSENGER SURVEY
SAN FRANCISCO BAY AREA

Metropolitan Transportation Commission

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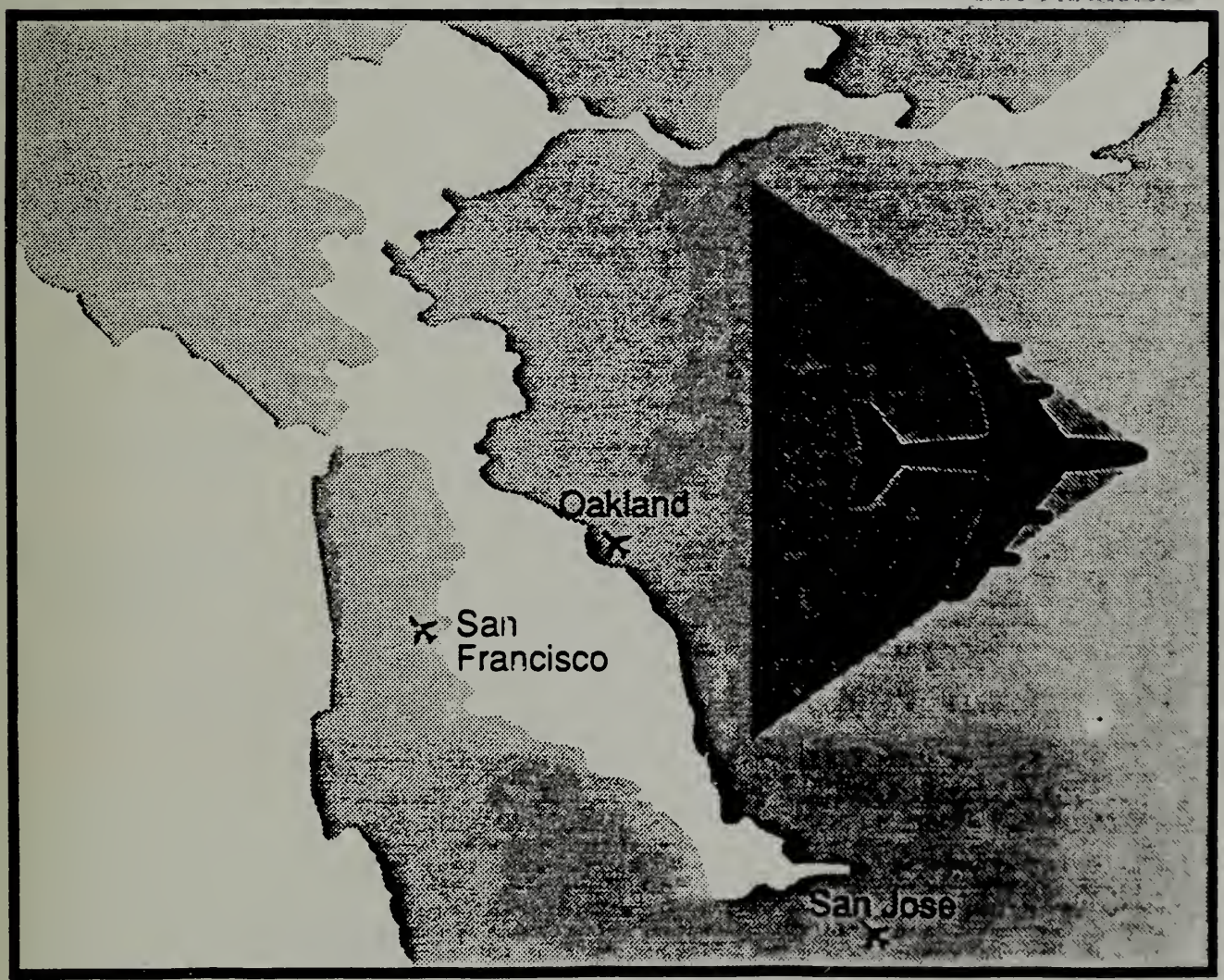

MTC
METROPOLITAN TRANSPORTATION COMMISSION

Joseph P. Bort MetroCenter • 101 Eighth Street • Oakland, CA 94607-4700 • FAX 415/464-7848

- 1990 AIR PASSENGER SURVEY -

- SAN FRANCISCO BAY AREA -

Prepared by the
Metropolitan Transportation Commission
MetroCenter
101 Eighth Street
Oakland, CA 94706
August, 1991

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[San Francisco
International Airport
1991]

REGIONAL AIRPORT PLANNING COMMITTEE

The 1990 Air Passenger Survey was conducted under the auspices of the Regional Airport Planning Committee(RAPC). RAPC advises the Association of Bay Area Governments (ABAG) and the Metropolitan Transportation Commission's (MTC) on aviation matters and prepares the Regional Airport Plan for the nine-county San Francisco Bay Area.

Sam Caddle	- Chair RAPC - ABAG Commissioner
Jane Baker	- City of San Mateo - MTC Commissioner
Nancy Benjamin	- California Department of Transportation Division of Aeronautics
John Dustin	- Bay Conservation and Development Commission
Arnold Feener	- San Francisco International Airport
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David Karp	- Mayor, City of San Leandro - MTC Commissioner
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Angelo Siracusa	- Bay Area Council - MTC Commissioner
James Spering	- Suisun City - MTC Commissioner
John Glover	- Port of Oakland
Hal Wight	- Buchanan Field, Concord - Represents Bay Area Airport Managers

MTC STAFF

Lawrence D. Dahms	- MTC Executive Director
William F. Hein	- MTC Deputy Executive Director
Chris Brittle	- MTC Manager of Planning
Marc Roddin	- MTC Staff Liaison - Air Passenger Survey Project Manager
Chase Stockton	- Planning Intern
James Cunradi	- Planning Intern

TABLE OF CONTENTS

		PAGE
I.	INTRODUCTION	9
II.	SURVEY METHODOLOGY	10
III.	SUMMARY AND FINDINGS	17
IV.	TABLES	
	1. AIR TRAFFIC GROWTH TRENDS	
TABLE 1.1	SAN FRANCISCO BAY AREA AIR TRAFFIC GROWTH TRENDS 1980 - 1990	23
TABLE 1.2	SAN FRANCISCO BAY AREA AIR TRAFFIC GROWTH 1975 - 1990	24
	2. ORIGINS OF AIR PARTIES	
TABLE 2.1	TRENDS IN AIRPORT USE BY COUNTY OF ORIGIN 1980 - 1990	25
TABLE 2.2	COUNTY OF ORIGIN BY AIR PARTY RESIDENCE STATUS	26
TABLE 2.3	ORIGINS OF AIR PARTIES BY COUNTY 1975 - 1990	27
TABLE 2.4	ORIGINS OF RESIDENTS AND NON-RESIDENTS BY AIRPORT	28
TABLE 2.5	RESIDENCE STATUS OF AIR PARTIES BY COUNTY OF ORIGIN	29
TABLE 2.6	COUNTY OF RESIDENCE VERSES COUNTY LEFT FOR AIRPORT	30
TABLE 2.7	ORIGINS OF AIR PARTIES ADJUSTED BY AIR PARTY SIZE 1980 - 1990	31
TABLE 2.8	COUNTY OF ORIGIN BY TYPE OF LOCATION LEFT FOR AIRPORT	32
TABLE 2.9	TYPE OF LOCATION AIR PARTY LEFT FOR AIRPORT	33
TABLE 2.10	ORIGINS OF AIR PARTIES BY AIRPORT AND FLIGHT DESTINATION	34
TABLES 2.11 a-j	**ORIGINS OF AIR PARTIES FOR CITIES WITHIN BAY AREA COUNTIES 1980 -1990**	-
TABLE 2.11a	ALAMEDA COUNTY	35
TABLE 2.11b	CONTRA COSTA COUNTY	36
TABLE 2.11c	MARIN COUNTY	37
TABLE 2.11d	NAPA COUNTY	38
TABLE 2.11e	SAN FRANCISCO COUNTY	39
TABLE 2.11f	SAN MATEO COUNTY	40
TABLE 2.11g	SANTA CLARA COUNTY	41
TABLE 2.11h	SOLANO COUNTY	42
TABLE 2.11i	SONOMA COUNTY	43
TABLE 2.11j	OUT OF REGION	44
TABLE 2.12	COUNTY OF ORIGIN (FOR NORTHERN CALIFORNIA)	45
FIGURE 2.1	COUNTY OF ORIGIN 1980 - 1990	46

TABLE OF CONTENTS

IV. TABLES

PAGE

3. GROUND TRANSPORTATION

TABLE 3.1	GROUND TRANSPORTATION BY RESIDENCE AND TRIP PURPOSE	47
TABLE 3.2	GROUND TRANSPORTATION MODE BY AIRPORT	48
TABLE 3.3	GROUND TRANSPORTATION BY RESIDENCE STATUS	49
TABLE 3.4	TRENDS IN GROUND TRANSPORTATION MODE SHARES 1975 -1990 SAN FRANCISCO INTERNATIONAL AIRPORT	50
TABLE 3.5	TRENDS IN GROUND TRANSPORTATION MODE SHARES 1975 -1990 OAKLAND INTERNATIONAL AIRPORT	51
TABLE 3.6	TRENDS IN GROUND TRANSPORTATION MODE SHARES 1975 -1990 SAN JOSE INTERNATIONAL AIRPORT	52
TABLE 3.7	GROUND TRANSPORTATION MODE SHARE BY COUNTY OF ORIGIN SAN FRANCISCO INTERNATIONAL AIRPORT	53
TABLE 3.8	GROUND TRANSPORTATION MODE SHARE BY COUNTY OF ORIGIN OAKLAND INTERNATIONAL AIRPORT	54
TABLE 3.9	GROUND TRANSPORTATION MODE SHARE BY COUNTY OF ORIGIN SAN JOSE INTERNATIONAL AIRPORT	55
TABLE 3.10	GROUND TRANSPORTATION MODE CHOICE BY INCOME	56
TABLE 3.11	GROUND TRANSPORTATION MODE CHOICE BY AGE	57
TABLE 3.12	MEANS BY WHICH AIR PARTIES REACHED TRANSIT SERVICE	58
TABLE 3.13	AIR PARTY SIZE, LUGGAGE AND ACCOMPANIERS BY GROUND TRANSPORTATION MODE	59
TABLE 3.14	GROUND TRANSPORTATION MODE BY FLIGHT DESTINATION	60
TABLE 3.15	GROUND TRANSPORTATION MODE BY TYPE OF LOCATION FROM WHICH AIR PARTY LEFT FOR AIRPORT	61
FIGURE 3.1	GROUND TRANSPORTATION MODE SHARE FOR ALL BAY AREA AIRPORTS	62

4. PARKING

TABLE 4.1	WHERE CARS ARE PARKED AT BAY AREA AIRPORTS	63
TABLE 4.2	FOR AIR PARTIES DRIVING TO THE AIRPORT, WERE CARS PARKED AT THE AIRPORT OR DRIVEN AWAY BY OTHERS 1985 -1990	64
TABLE 4.3	PARKING SEQUENCE OF AIR PARTIES USING PRIVATE CARS FOR THEIR TRIP TO THE AIRPORT 1985 - 1990	65

TABLE OF CONTENTS

IV. TABLES

PAGE

5. TRIP PURPOSE

TABLE 5.1	TRIP PURPOSE BY AIRPORT	66
TABLE 5.2	TRIP PURPOSE BY COUNTY OF ORIGIN (General Categories)	67
TABLE 5.3	TRIP PURPOSE BY COUNTY OF ORIGIN	68
TABLE 5.4	TRIP PURPOSE BY INCOME	69
TABLE 5.5	TRIP PURPOSE BY AGE	70

6. REASONS FOR CHOOSING AIRPORT

TABLE 6.1	REASONS GIVEN FOR SELECTING AIRPORT BY FLIGHT DESTINATION	71
TABLE 6.2	REASONS GIVEN FOR SELECTING AIRPORT BY AGE	72
TABLE 6.3	REASONS GIVEN FOR SELECTING AIRPORT INCOME SAN FRANCISCO INTERNATIONAL AIRPORT	73
TABLE 6.4	REASONS GIVEN FOR SELECTING AIRPORT INCOME OAKLAND INTERNATIONAL AIRPORT	74
TABLE 6.5	REASONS GIVEN FOR SELECTING AIRPORT INCOME SAN JOSE INTERNATIONAL AIRPORT	75

7. AIRPORT ARRIVAL TIMES

TABLE 7.1	AVERAGE AIRPORT ARRIVAL TIMES PRIOR TO FLIGHT BY FLIGHT DESTINATION	76
TABLE 7.2	AVERAGE AIRPORT ARRIVAL TIMES PRIOR TO FLIGHT BY GROUND TRANSPORTATION MODE FOR EACH AIRPORT	77
TABLE 7.3	AVERAGE AIRPORT ARRIVAL TIMES PRIOR TO FLIGHT BY GROUND TRANSPORTATION AND TRIP PURPOSE	78

8. FREQUENCY OF FLYING, TRIP DURATION AND AIR PARTY DEMOGRAPHICS

TABLE 8.1	FREQUENCY OF FLYING FOR AIR PARTIES BY COUNTY OF RESIDENCES	79
TABLE 8.2	TRIP DURATION BY RESIDENCE STATUS AND TRIP PURPOSE	80
TABLE 8.3	INCOME BY COUNTY OF RESIDENCE	82
TABLE 8.4	RESIDENCE STATUS OF AIR PARTIES BY AIRPORT	83
TABLE 8.5	AIR PARTY SIZE, LUGGAGE AND ACCOMPANIERS BY AIRPORT	84

TABLE OF CONTENTS

TABLES		PAGE
	9. FLIGHT DESTINATIONS	
TABLE 9.1	FLIGHT DESTINATIONS BY COUNTY OF ORIGIN	85
TABLE 9.2	FLIGHT DESTINATIONS FOR INTRA-CALIFORNIA AIR TRAVELERS	86

APPENDICES

APPENDIX 1	DEFINITIONS	87
APPENDIX 2	SURVEY INSTRUMENT	88
APPENDIX 3	INTERVIEWER PROMPT CARDS	89

- PART I -

- INTRODUCTION -

This report presents the findings of the *1990 Air Passenger Survey* performed by the Metropolitan Transportation Commission (MTC) with the cooperation of the three major San Francisco Bay Area commercial airports, San Francisco International Airport (SFO), San Jose International Airport (SJC) and Oakland International Airport (OAK). The survey is conducted every five years to provide up-to-date information on the origins of air parties; the type of transportation used to get to the airport; reasons for choosing a particular airport; and on the characteristics of air travelers such as air party size, amount of luggage, number of well wishers, and the times air parties arrive at the airport prior to their flights.

The *Air Passenger Survey* is used for long-range airport planning, for marketing airports and travel services, for media and public information, and to improve ground transportation to Bay Area airports.

The following report contains a summary of major survey findings, an explanation of survey sample methodology, and a series of tables presenting much of the information gathered from the survey. For individuals and agencies in need of information not contained in this report, data diskettes in ASCII format are available for licensing from MTC.

- PART II -

- SURVEY METHODOLOGY -

SURVEY DATES

This portion of the report explains how the 1990 Air Passenger Survey was designed and implemented and provides information useful for interpreting the survey results.

The 1990 Air Passenger Survey was conducted in seven 12-hour days from August, 13 through August, 19 at San Francisco, Oakland and San Jose Airports.

CHANGES FROM PRIOR SURVEYS

The format of the 1990 Air Passenger Survey has been altered slightly from previous years to present a more logical sequence of questions. The changes make interviews more comfortable for respondents and facilitate data entry. The changes will not materially effect the outcome of the survey nor preclude the ability to compare most of the survey results with reports from prior years. The use of a much larger sample size in the 1990 survey than in past years will allow slightly more reliable analysis of questions that require a high degree of precision such as air party origins and ground transportation mode choice.

In addition, the 1990 Air Passenger Survey report contains several elements not included in prior reports.

For example, new in this year's report are several tables which describe the reasons why air parties chose the airport from which their flight left and how many times each air party used Bay Area airports. In addition, this report carries a breakdown of ground transportation mode choice by such demographic factors as the income and age of the respondent.

Where practical, the 1990 Air Passenger Survey tries to provide information from several years' survey results in single tables to allow ready comparisons with prior years.

One element not included in this year's survey is information on connecting passengers. In past surveys, respondents were asked midway through the interview whether or not their party were connecting passengers. Interviews in which respondents indicated that they were connecting or through passengers were then terminated. Since interviews with connecting and though passengers were substantially shorter than interviews with departing passengers, they tended to be systematically over-sampled. Consequently, in the past, interviewers spent an inordinate time interviewing respondents outside the target population of air parties arriving at the airport by ground transportation.

In addition, for the 1990 survey, respondents were asked at the outset of the interview whether or not they were connecting or though passengers, and affirmative response terminated the interview. This change greatly increased the efficiency of interviews but makes it impossible to tabulate information about connecting and through passengers.

SURVEY METHOD

The survey was administered using in-person interviews of departing passengers waiting in passenger boarding areas. Only passengers waiting to board planes were interviewed. Within boarding areas, air parties were selected at random and one interview was conducted per boarding air party. Ninety interviewers were dispatched to cover over 1400 departing flights.

To ensure that the survey samples were representative of actual travel patterns, an effort was made to interview a sub-sample of air parties from each departing flight, for different times of day and for all seven days of the week.

Finally, to reduce the likelihood of data coding errors, each interviewer was responsible for post-coding surveys at the end of his or her shift. Information on airline flight, airport destination, county of origin and city of residence. This information was then checked for legibility and accuracy by a supervisor that same day. Two supervisors per shift were assigned to each airport by J.D Franz Research, the primary consultant for the project.

SURVEY DESIGN AND SAMPLE SIZE

The 1990 Air Passenger Survey is designed to provide an accurate representation of Bay Area air passenger characteristics and their travel behavior to the airport.

In general, the sample size is dependent on the desired "confidence level" and the "margin of error" of the survey results. For the regional sample, a confidence level of 99 percent was chosen. For each airport, the margin of error for the sample is less than 2 percent of the true values for survey responses. For the region as a whole, the margin of error is less than 1 percent. The actual sample sizes for each airport for 1985 and 1990 are given below.

SURVEY SAMPLE SIZE

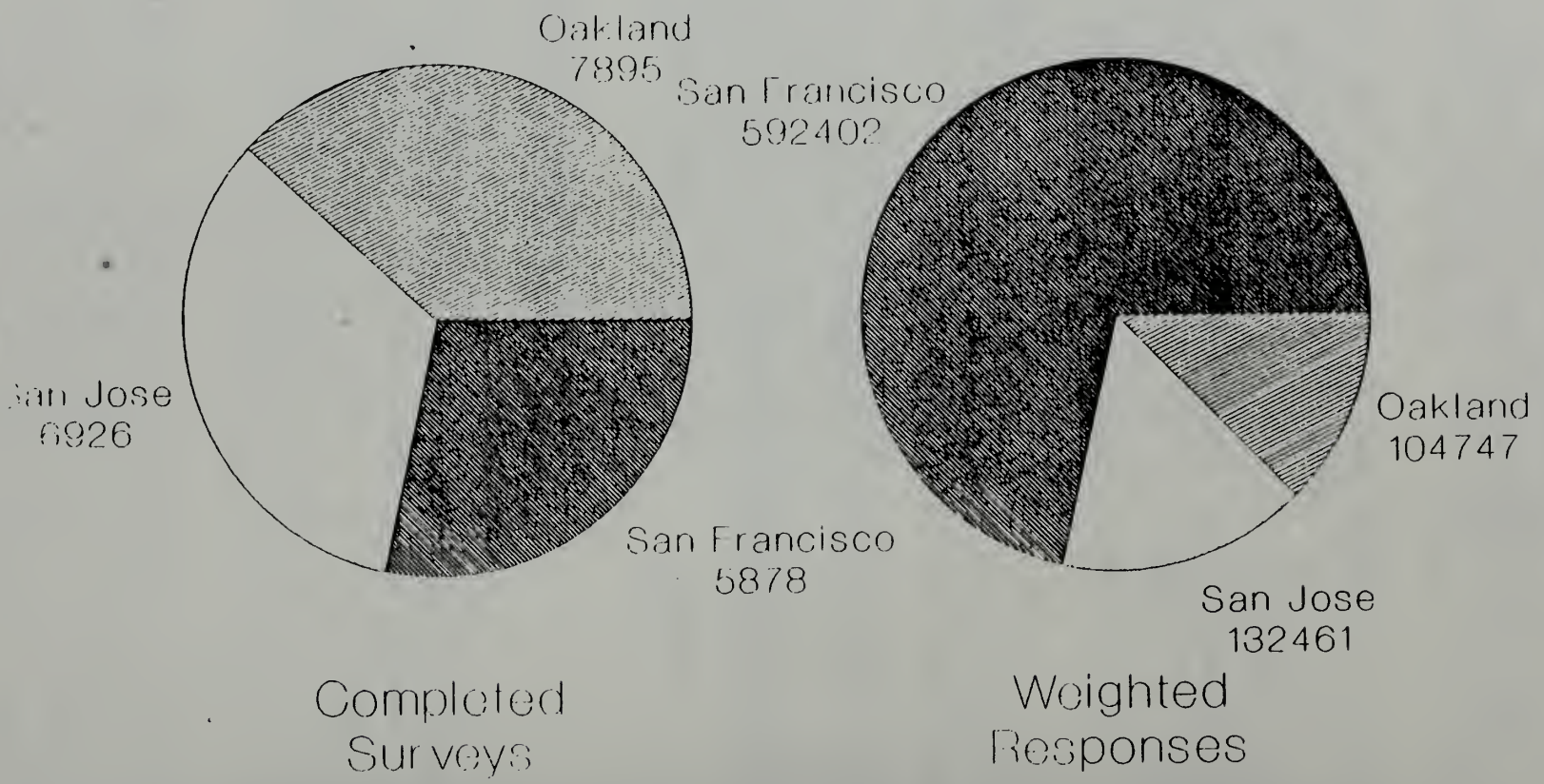
	1985	1990
SAN FRANCISCO INTERNATIONAL AIRPORT	4,399	5,878
OAKLAND INTERNATIONAL AIRPORT	1,583	7,895
SAN JOSE INTERNATIONAL AIRPORT	4,557	6,926
TOTAL	**10,539**	**20,699**

WEIGHTING PROCEDURES

While care was taken to collect a representative sample of air travelers, certain fundamental characteristics of air traffic precluded use of the sample results as a direct measure of air travel behavior. Since airports exhibit periods of peak usage and periods of relatively low travel activity, but survey workers can generally conduct interviews at the same rate regardless of how crowded the airport is, there will be a tendency to under-sample during busy times of the day and over-sample during quite periods.

Similarly, the tendency to over-sample and under-sample also applies to interviews conducted in departure lounges served by different size aircraft or serving different destinations. For example, a single team of interviewers will under-sample air parties boarding large jet aircraft bound for domestic and international destinations due to the large number of passengers waiting in the boarding areas. Conversely, air parties boarding smaller aircraft bound for

Figure 1
Interviews at Bay Area Airports
20,699 Surveys Administered



smaller airports within California will be over-sampled due to the relative small number of waiting passengers in the departure lounge.

To compensate for over-sampling and under-sampling, a system of "weighted" responses was used to make the sample proportions by destination, aircraft type, time of day and day of week reflect actual use patterns gathered from airline schedules in the Official Airline Guide.

After the sample was weighted by the above criteria, the entire sample was weighted again by each airport's share of the region's air traffic distributions. Figure 1 shows the end result of the sample weighting procedures. The total weighted responses corresponds to the total number of air travelers using Bay Area airports during the week of the survey. Unless otherwise noted, all the tables contained in this report use weighted responses.

Neither of these weighting procedures effects the answers given by respondents.The weighting procedure is only used to make the sample proportions of air parties with different characteristics and different travel behaviors mirror their proportions found in the actual population of air travelers.

FOREIGN LANGUAGE INTERVIEWS

To ensure that no biases were introduced into the interview process through the exclusion of non-English speakers, prevalent on international flights, an effort was made to recruit interviewers with foreign language proficiency.

The following table gives a breakdown of interviewer language skills at each airport. The total number of interviewers will be less that those proficient in each language since some interviewers were fluent in more than one language other than English. The use of multilingual interviewers is a departure from previous surveys and enables survey workers to sample air parties on every international flight.

Language	SFO	OAK	SJC
TOTAL INTERVIEWERS	25	25	40
English Only	18	19	30
Spanish	4	4	6
German	4	1	-
French	1	2	2
Russian	1	1	-
S. Pacific Languages	1	-	-
Greek	-	1	-
Italian	-	1	-
Armenian	-	-	1
Cantonese	-	-	1
Tagalog	-	-	1
Vietnamese	-	-	1

SURVEY MANAGEMENT

Survey management tasks were divided between MTC and its consultants. The Metropolitan Transportation Commission was responsible for managing the survey and for coordination between its consultants and the three Bay Area airports. MTC staff also designed the survey questionnaire, developed daily flight interview schedules and produced the final report.

San Francisco International Airport, Oakland International Airport and San Jose International Airport each helped finance the survey.

J. D. Franz Research evaluated the sample size, pretested the survey, conducted interviewer recruitment, training and supervision, supplied survey administration, and provided a clean set of computer-ready data to MTC for further analysis.

Air party origins and census tract information were coded by E. H. White & Company.

REMARKS ON USE OF THE 1990 AIR PASSENGER SURVEY

Use of the information in this survey requires some knowledge of its limitations. For instance, the month of August has a higher proportion of vacation travel than other months and therefore is not necessarily a representative month of air travel. Also, airport ground transportation information is based on air parties' mode of travel to the airport for a departing flight. Transportation choices may be different for air parties arriving on incoming flights.

The figures given in some tables may be less reliable than others depending on the number of options and the number of respondents. For example, tables 3.7 3.8 and 3.9 show all ground transportation modes by county of origin; these will not be as reliable than a similar table using more general categories. This is due to the small number of respondents that actually meet relatively narrow criteria such as the percent of air parties using a particular company's airporter bus service, living in Solano County and using Oakland Airport.

Similarly, for air party origins, data at the county level and for larger cities will be very accurate. For tables that examine origins for smaller towns and cities in the region or counties outside the Bay Area, there will be less reliability. Again, tables with a great level of detail, with many categories or with a small number of respondents should be used with caution. Data users that require more detailed analysis than that presented in this report may licence the data from MTC for use on their own computers. Write to Marc Roddin for rate inquiries.

- PART III -

- SUMMARY AND FINDINGS -

This part of the report summarizes some findings of the 1990 Air Passenger Survey. For a more complete picture of Bay Area air travelers, Part IV presents the survey results in predominantly table format with several select charts.

1. AIR TRAFFIC GROWTH TRENDS

Since 1980, air travel in the San Francisco Bay Area has grown by close to 14 million trips per year. San Francisco International Airport (SFO) continues to be the largest airport in the region, claiming the largest share of the region's continuing growth in air travel. In the last decade, SFO's passenger traffic has grown by 31.1 percent, over half the region's overall growth. San Jose and Oakland airports, while accounting for a smaller portion of the region's air traffic, experience much faster growth rates. Oakland International Airport's passenger traffic grew by 107.9 percent in the last decade and San Jose International Airport grew by 111.4 percent. Air travel in the region, grew by 47.3 percent, with over 42 million air passengers using Bay Area airports in 1990.

2. ORIGINS OF AIR PARTIES

ORIGINS OF AIR PARTIES IN THE BAY AREA

San Francisco International Airport remains the region's dominant commercial airport, claiming 70.6 percent of the Bay Area's air travelers. For some counties (Marin, San Francisco and San Mateo), SFO's market share is over 90 percent. SFO currently claims significant shares of air travelers from Alameda County (46.7%) and Santa Clara County (40.5%), both of which are home to major commercial airports.

San Jose Airport attracts a majority of air travelers in Santa Clara County (57.5%) and a significant number of out-of-region travelers (35.5%) mostly from Santa Cruz, Stanislaus and Monterey Counties. To the north, San Jose Airport's market does not extend much beyond Santa Clara County, and Southern Alameda County (7.4%).

For all three major commercial airports, San Francisco is the largest source for trip origins for business (28.8%) and non-business travelers (27.6%). Santa Clara County, with its growing concentration of employment, now accounts for 25.9 percent of business trip origins.

OUT-OF-REGION ORIGINS

Air parties whose trip to the airport originated outside the Bay Area, predominantly from counties adjacent to the nine contiguous counties, are termed "Out-of-Region" origins. This term refers only to air parties who arrive at the airport from counties outside the nine-county Bay Area by ground transportation, not those who fly into the airport from outside the region. Most air parties from outside the Bay Area that use the region's airports originate from Santa Cruz, Stanislaus, San Joaquin and Monterey Counties. The share of all airport users from outside the region has declined from 7 percent in 1980 to only 2.4 percent in 1990.

In addition, the distribution of these air travelers among the three Bay Area airports has also shifted with the share using SFO declining steadily for the last decade. In 1980, SFO attracted 78 percent of air parties originating outside the Bay Area the out-of-region air parties. In 1990, SFO's share has dropped to 46 percent. San Jose International Airport, during the same period has doubled its share of out-of-region air parties, up from 18 percent in 1980 to 35.5 percent in 1990. Oakland International Airport has seen its share of out-of-region air parties more than quadruple from 4 percent in 1980 to over 18 percent in 1990. Most of Oakland's growth in out-of-region air party originations have been from neighboring Stanislaus and San Joaquin Counties. These two Central Valley counties have seen rapid growth in population in recent years. The nearest large airports serving these burgeoning counties are in Sacramento and Oakland.

3. TRENDS IN GROUND TRANSPORTATION MODE CHOICE

PRIVATE AUTOMOBILE

The private automobile is the most common form of ground transportation used by users of Bay Area airports, accounting for half of all trips to the airport. SFO has the lowest rate with 46 percent of air parties choosing private cars. OAK and SJC have automobile mode shares of 69 percent and 6(percent, respectively.

TRANSIT

Scheduled public transit, chiefly bus service provided by AC Transit SamTrans and Santa Clara County Transit, has the second lowest mode shar in the region, just slightly ahead of charter and tour buses. Public bus servic currently claims 1 percent of all trips to Bay Area airports. A notabl exception is AirBART, express minibuses which link BART's Coliseum Statio with Oakland International Airport. AirBART serves about 4 percent o Oakland's air travelers, down slightly from its peak in 1980 at 6.5 percent.

GROUND TRANSPORTATION AND AIR PARTY CHARACTERISTICS

People of different economic means and different ages make different transportation choices for their trips to the airport. The percentage using private cars declines steadily from 63 percent for respondents with total household incomes less than $12,000 to about 46 percent for households making over $100,000 annually. Rental car mode share by income exhibits the opposite trend--the higher the income group of the respondents, the higher the rate of rental car use.

4. TRENDS IN AIRPORT PARKING AND CONGESTION

The survey shows that more air parties drop off passengers at the curb before parking their cars. It also shows high numbers of air parties being dropped off at the curb by others. Both are responsible for growing surface congestion at Bay Area airports.

Since 1985, the number of respondents parking their vehicles for the entire duration of their trip has decreased at all Bay Area airports. San Francisco Airport showed the largest drop from 25.6 percent in 1985 to 18.6 percent in 1990. In addition, the portion of passengers that are dropped off at the curb and the vehicle is driven away by others fell slightly at SFO but increased at Oakland and San Jose airports. However, the portions of air parties that drop off passengers at the curb first and then park their vehicle has nearly doubled at SFO from 33 percent in 1985 to 58.7 percent in 1990. At San Jose Airport, this portion increased from 30.8 percent in 1985 to 56.8 percent in 1990. These trends have created much more traffic on terminal approach roads and increased surface congestion.

5. TRIP PURPOSE

This section examines the trip purposes of Bay Area air travelers. Santa Clara County has the highest portion of business-related travel, with 42.6 percent of total trips. San Francisco has the second highest portion at 36.4 percent.

Most frequently represented in business travel are those household earning over $100,000 annually. For non-business travel, households earning between $50,000 and $75,000 annually are most frequently represented.

6. REASONS GIVEN FOR AIRPORT CHOICE

The five tables in this section analyze the reasons why air parties choose a particular Bay Area airport by their destination, the age of the respondent and by the air party's household income.

The most commonly cited determinant of airport choice, regardless of air party characteristics, was closeness to residence, hotel or business. This is especially true for air parties with California destinations and for travelers under 19 years old or over 65 years old.

Cheaper, more convenient parking was given as the main reason for choosing the airport by the fewest number of people interviewed. This is true when respondents are divided by age, income and destination. Less than one percent of respondents cite parking as the main consideration in airport choice. A notable exception are intra-California travelers using Oakland Airport. For this group, 3.8 percent listed parking cost and convenience as the main reason for choosing Oakland Airport.

San Jose International Airport users overwhelmingly cited closeness to home, hotel and office as the main reason for choosing the airport. The majority of trip origins bound for SJC are from Santa Clara County, the airport's primary market. San Francisco and Oakland airports, conversely, have a greater portion of respondents citing service competition as their main reasons for choosing one of the two airports. For example, nearly one fourth of respondents at SFO cited the availability of direct flights to their destination as the primary reason for choosing that airport. At Oakland Airport, a similar portion of respondents cited lower airline fares as the dominant factor influencing their airport choice.

7. ARRIVAL TIMES PRIOR TO FLIGHT

For all Bay Area airports, the private car allows respondents the shortest wait times between arrival at the airport and flight departure. Air parties using private cars for their trip to the airport, arrived about 70 minutes before the respondent's scheduled departure. Luxury limousine and taxi service delivered air parties approximately 77 minutes before the respondent's flight.

Respondents who took scheduled public transit, airporter express buses and other transit services to the airport, arrive about 88 minutes before their flight leaves. Public transit at Oakland Airport, however, allows later arrivals for departing air parties. Respondents using transit to get to Oakland Airport arrived an average of 62 minutes before their flight. Respondents using private cars, by comparison, enjoy only a two minute advantage, arriving

about 60 minutes before their flight departure. Respondents at SFO using virtually all ground transportation modes arrived at the airport earlier than respondents at OAK and SJC.

Business travelers using Bay Area airports show a consistent tendency, regardless of ground transportation mode, to arrive slightly later than non-business travelers. This may be due to a greater frequency of flying by business travelers, and hence a greater understanding of schedules and expected process times and fewer pieces of checked luggage.

8. FREQUENCY OF FLYING, TRIP DURATION AND AIR PARTY DEMOGRAPHICS

Most users of San Francisco and San Jose airports are visitors from outside the Bay Area. At San Francisco Airport and San Jose airports 61.9 percent and 52 percent were non-residents, respectively. Only Oakland Airport had mostly Bay Area residents as its primary patrons (51%).

Marin County and Contra Costa County residents were the most frequent air travelers making an average 11.8 trips and 11.3 yearly trips respectively. Napa County residents used Bay Area Airports the least, making 5.0 trips per year. Bay Area residents in general made 6.1 trips per year from San Francisco Airport, 1.6 trips from Oakland Airport and 1.9 trips from San Jose Airport.

For most trip purposes, Bay Area residents take longer trips than non-residents. An average Bay Area resident stays 8.9 nights away from the region and an average non-resident stays 7.6 nights in the Bay Area.

9. FLIGHT DESTINATIONS

CALIFORNIA DESTINATIONS

For air parties with California destinations, Los Angeles not surprisingly, is the destination of the most Bay Area air travelers (44.1%). San Diego is the second most frequent California destination, attracting 17.1 percent of intra-state air travelers. Other Los Angeles-area airports account for the top 6 intra-California destinations (Burbank 12.4%, Santa Ana 10.2%, Ontario 8.2% and Long Beach 4.8 percent).

- PART IV -

- TABLES -

-PART IV -

- SECTION 1 -

- AIR TRAFFIC GROWTH TRENDS -

TABLE 1.1

SAN FRANCISCO BAY AREA
AIR TRAFFIC GROWTH TRENDS
1980 -1990

Enplaning and Deplaning Air Passengers

YEAR	SAN FRANCISCO INTERNATIONAL AIRPORT	OAKLAND INTERNATIONAL AIRPORT	SAN JOSE INTERNATIONAL AIRPORT	ALL BAY AREA AIRPORTS
1980	22,660,090	2,530,390	3,354,230	28,544,710
1981	20,381,370	2,451,050	2,726,790	25,559,210
1982	20,813,050	2,773,380	2,940,480	26,526,910
1983	22,317,790	2,944,500	3,438,640	28,700,930
1984	24,321,670	3,287,490	3,798,670	31,407,830
1985	24,700,580	4,205,070	4,413,770	33,319,420
1986	27,257,780	3,892,870	5,625,800	36,776,450
1987	29,557,000	3,936,570	5,680,210	39,173,780
1988	30,136,242	3,897,774	5,715,759	39,749,775
1989	30,306,109	3,987,460	6,365,314	40,658,883
1990	29,708,779	5,261,164	7,090,268	42,060,211
1980 - 1990 PERCENT GROWTH	**31.1%**	**107.9%**	**111.4%**	**47.3%**

TABLE 1.2

SAN FRANCISCO BAY AREA
AIR TRAFFIC GROWTH
1975 - 1990

AIRPORT	1975 - 1980 PASSENGER INCREASE	1975 - 1980 SHARE OF REGION'S GROWTH	1980 -1985 PASSENGER INCREASE	1980 -1985 SHARE OF REGION'S GROWTH	1985 - 1990 PASSENGER INCREASE	1985 - 1990 SHARE OF REGION'S GROWTH
SFO	4,744,260	86.1%	3,489,100	51.2%	5,008,199	57.3%
OAK	202,280	3.7%	1,787,970	26.2%	1,056,094	12.1%
SJC	565,680	10.3%	1,536,850	22.6%	2,676,498	30.6%
TOTAL	5,512,220	100.0%	6,813,920	100.0%	8,740,791	100.0%

NOTE:

SFO is San Francisco International Airport

OAK is Oakland International Airport

SJC is San Jose International Airport formerly San Jose Municipal Airport

- PART IV -

- SECTION 2 -

- ORIGINS OF AIR PARTIES -

TABLE 2.1

TRENDS IN AIRPORT USE BY COUNTY OF ORIGIN 1980 - 1990

	SAN FRANCISCO (SFO)			OAKLAND (OAK)			SAN JOSE (SJC)		
COUNTY OF ORIGIN	1980	1985	1990	1980	1985	1990	1980	1985	1990
ALAMEDA	54.6%	41.5%	48.5%	39.0%	51.6%	46.7%	6.4%	6.9%	7.4%
CONTRA COSTA	58.6%	50.1%	50.6%	39.6%	48.0%	47.0%	1.8%	1.9%	2.4%
MARIN	92.5%	91.9%	93.4%	7.5%	7.9%	6.1%	-	0.2%	0.5%
NAPA	73.3%	68.9%	85.4%	26.7%	30.0%	13.1%	-	1.1%	1.4%
SAN FRANCISCO	98.6%	96.7%	96.4%	1.3%	3.0%	3.1%	0.1%	0.3%	0.5%
SAN MATEO	95.7%	95.6%	96.1%	0.3%	1.5%	1.4%	4.0%	2.9%	2.5%
SANTA CLARA	44.6%	41.6%	40.5%	0.5%	2.1%	2.0%	54.9%	56.3%	57.5%
SOLANO	86.1%	60.5%	72.9%	13.9%	39.3%	26.3%	-	0.2%	0.8%
SONOMA	83.0%	91.9%	89.2%	17.0%	7.5%	10.4%	-	0.6%	0.4%
OUT-OF-REGION	78.0%	63.8%	46.1%	3.9%	9.4%	18.4%	18.1%	26.8%	35.5%

TABLE 2.2

COUNTY OF ORIGIN BY AIR PARTY RESIDENCE STATUS

	SAN FRANCISCO (SFO)			SAN JOSE (SJC)			OAKLAND (OAK)		
	AIR PARTY RESIDENCE STATUS								
COUNTY OF ORIGIN	BAY AREA RESIDENTS	NON-RESIDENTS	ALL AIR PARTIES	BAY AREA RESIDENTS	NON-RESIDENTS	ALL AIR PARTIES	BAY AREA RESIDENTS	NON-RESIDENTS	ALL AIR PARTIES
ALAMEDA	45.9%	51.1%	48.5%	7.4%	7.4%	7.4%	46.7%	41.5%	44.1%
CONTRA COSTA	48.5%	53.2%	50.6%	1.6%	3.3%	2.4%	49.9%	43.6%	47.0%
MARIN	93.0%	93.6%	93.4%	0.2%	0.7%	0.5%	6.7%	5.6%	6.1%
NAPA	86.5%	84.7%	85.4%	1.5%	1.4%	1.4%	12.0%	13.9%	13.1%
SAN FRANCISCO	96.2%	96.5%	96.4%	0.3%	0.6%	0.5%	3.5%	2.9%	3.1%
SAN MATEO	95.5%	96.5%	96.1%	3.0%	2.1%	2.5%	1.4%	1.4%	1.4%
SANTA CLARA	36.4%	44.2%	40.5%	61.5%	53.8%	57.5%	2.1%	2.0%	2.0%
SOLANO	71.8%	73.9%	72.9%	1.7%	0.0%	0.8%	26.5%	26.1%	26.3%
SONOMA	89.0%	89.5%	89.2%	0.4%	0.4%	0.4%	10.6%	10.2%	10.4%
OUT-OF-REGION	13.7%	47.9%	46.1%	54.1%	34.5%	35.5%	32.3%	17.6%	18.4%

TABLE 2.3

ORIGINS OF AIR PARTIES BY COUNTY 1975 - 1990

	ALL AIR PARTIES				EXCLUDING AIR PARTIES ORIGINATING OUTSIDE BAY AREA			
COUNTY OF ORIGIN	1975	1980	1985	1990	1975	1980	1985	1990
ALAMEDA	15.4%	14.0%	14.0%	15.3%	16.2%	15.1%	15.0%	15.7%
CONTRA COSTA	6.4%	6.8%	7.1%	7.2%	6.7%	7.3%	7.6%	7.3%
MARIN	4.3%	3.8%	4.3%	4.7%	4.5%	4.1%	4.6%	4.8%
NAPA	0.5%	0.5%	0.7%	1.4%	0.5%	0.5%	0.8%	1.4%
SAN FRANCISCO	32.0%	31.1%	29.6%	28.3%	33.5%	33.4%	31.9%	29.0%
SAN MATEO	15.6%	12.4%	13.6%	14.7%	16.3%	13.3%	14.6%	15.1%
SANTA CLARA	17.5%	20.2%	19.6%	21.2%	18.4%	21.8%	21.1%	21.7%
SOLANO	1.8%	2.5%	1.4%	2.2%	1.9%	2.7%	1.6%	2.2%
SONOMA	1.9%	1.7%	2.6%	2.8%	2.0%	1.8%	2.8%	2.8%
OUT OF REGION	4.6%	7.0%	7.1%	2.4%	-	-	-	-
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ORIGIN BY GEOGRAPHIC REGION

	1975	1980	1985	1990
WEST BAY (San Francisco and San Mateo)	47.6%	43.5%	43.2%	43.0%
SOUTH BAY (Santa Clara)	17.5%	20.2%	19.6%	21.2%
EAST BAY (Alameda and Contra Costa)	21.8%	20.8%	21.1%	22.5%
NORTH BAY (Marin, Napa, Solano and Sonoma	8.5%	8.5%	9.0%	10.9%
OUT OF REGION	4.6%	7.0%	7.1%	2.4%
TOTAL	100.0%	100.0%	100.0%	100.0%

TABLE 2.4

ORIGINS OF RESIDENTS AND NON-RESIDENTS BY AIRPORT

	SAN FRANCISCO (SFO)		OAKLAND (OAK)		SAN JOSE (SJC)		BAY AREA (ALL AIRPORTS)	
COUNTY OF ORIGIN	BAY AREA RESIDENTS	NON-RESIDENTS	BAY AREA RESIDENTS	NON-RESIDENTS	BAY AREA RESIDENTS	NON-RESIDENTS	BAY AREA RESIDENTS	NON-RESIDENTS
ALAMEDA	13.2%	8.8%	53.0%	48.1%	8.0%	7.2%	18.9%	13.0%
CONTRA COSTA	7.0%	4.0%	28.7%	21.8%	0.9%	1.4%	9.6%	5.6%
MARIN	7.1%	5.4%	2.0%	2.2%	0.1%	0.2%	5.1%	4.4%
NAPA	1.7%	1.6%	1.0%	1.8%	0.1%	0.2%	1.3%	1.4%
SAN FRANCISCO	28.6%	43.6%	4.0%	8.8%	0.3%	1.4%	19.5%	34.0%
SAN MATEO	21.3%	18.4%	1.3%	1.8%	2.5%	2.2%	14.7%	14.4%
SANTA CLARA	13.6%	11.3%	3.1%	3.4%	86.8%	77.4%	24.5%	19.4%
SOLANO	2.8%	1.8%	4.1%	4.2%	0.2%	-	2.6%	1.8%
SONOMA	4.6%	2.6%	2.2%	1.9%	0.1%	0.1%	3.4%	2.2%
OUT OF REGION	0.1%	2.5%	0.6%	6.0%	1.0%	9.9%	0.4%	3.8%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 2.5

RESIDENCE STATUS OF AIR PARTIES BY COUNTY OF ORIGIN

RESIDENCE STATUS

COUNTY OF ORIGIN	RESIDENT OF COUNTY OF ORIGIN	RESIDENT OF OTHER BAY AREA COUNTY	NON-RESIDENT	TOTAL
ALAMEDA	46.5%	4.0%	49.6%	100.0%
CONTRA COSTA	50.6%	3.9%	45.5%	100.0%
MARIN	44.1%	9.3%	46.6%	100.0%
NAPA	22.3%	0.8%	76.9%	100.0%
SAN FRANCISCO	24.7%	4.0%	71.3%	100.0%
SAN MATEO	33.5%	8.2%	58.2%	100.0%
SANTA CLARA	44.2%	3.3%	52.5%	100.0%
SOLANO	46.6%	3.5%	49.9%	100.0%
SONOMA	51.7%	0.8%	47.4%	100.0%

TABLE 2.6

COUNTY OF RESIDENCE VERSES COUNTY LEFT FOR AIRPORT

COUNTY LEFT FOR AIRPORT

COUNTY OF RESIDENCE	ALAMEDA	CONTRA COSTA	MARIN	NAPA	SAN FRANCISCO	SAN MATEO	SANTA CLARA	SOLANO	SONOMA	OUT-OF-REGION	TOTAL
ALAMEDA	91.0%	1.6%	-	-	1.9%	2.8%	2.3%	0.3%	-	0.1%	100.0%
CONTRA COSTA	5.3%	85.2%	-	-	3.6%	2.8%	2.3%	-	-	0.7%	100.0%
MARIN	1.9%	0.9%	76.5%	-	14.3%	5.0%	1.2%	0.1%	-	0.2%	100.0%
NAPA	1.5%	0.6%	-	84.9%	-	2.4%	5.2%	5.2%	-	-	100.0%
SAN FRANCISCO	1.0%	0.8%	1.7%	-	90.1%	5.1%	0.8%	-	0.2%	0.3%	100.0%
SAN MATEO	0.7%	0.6%	2.4%	0.3%	4.8%	86.1%	4.7%	-	-	0.4%	100.0%
SANTA CLARA	1.3%	0.1%	0.2%	0.3%	1.3%	2.9%	93.4%	-	-	0.4%	100.0%
SOLANO	4.9%	1.4%	0.0%	2.8%	4.3%	0.3%	1.0%	84.9%	0.5%	-	100.0%
SONOMA	1.8%	-	4.8%	-	2.1%	1.8%	1.1%	1.1%	87.2%	0.2%	100.0%

TABLE 2.7

ORIGINS OF AIR PARTIES ADJUSTED BY PARTY SIZE 1980 - 1990

	1980			1985			1990		
COUNTY OF ORIGIN	PERCENT OF AIR PARTIES	AVERAGE AIR PARTY SIZE	PERCENT OF AIR PASSENGERS	PERCENT OF AIR PARTIES	AVERAGE AIR PARTY SIZE	PERCENT OF AIR PASSENGERS	PERCENT OF AIR PARTIES	AVERAGE AIR PARTY SIZE	PERCENT OF AIR PASSENGERS
ALAMEDA	14.0%	1.45	12.6%	14.0%	1.57	13.6%	15.3%	1.86	15.4%
CONTRA COSTA	6.8%	1.67	7.0%	7.1%	1.53	6.7%	7.2%	1.75	7.2%
MARIN	3.8%	1.74	4.1%	4.3%	1.95	5.2%	4.7%	1.99	4.6%
NAPA	0.5%	1.76	0.5%	0.7%	1.62	0.7%	1.4%	1.86	1.4%
SAN FRANCISCO	31.1%	1.70	32.7%	29.6%	1.66	30.4%	28.3%	1.94	28.0%
SAN MATEO	12.4%	1.65	12.7%	13.6%	1.66	14.0%	14.7%	2.03	14.5%
SANTA CLARA	20.2%	1.50	18.8%	19.6%	1.48	18.0%	21.2%	1.60	21.5%
SOLANO	2.5%	1.52	2.4%	1.4%	1.51	1.3%	2.2%	1.86	2.1%
SONOMA	1.7%	1.55	1.6%	2.6%	1.54	2.5%	2.8%	1.85	2.7%
OUT OF REGION	7.0%	1.76	7.6%	7.1%	1.73	7.6%	2.4%	1.95	2.4%
TOTAL	100.0%		100.0%	100.0%		100.0%	100.0%		100.0%

TABLE 2.8

COUNTY OF ORIGIN BY TYPE OF LOCATION LEFT FOR AIRPORT

COUNTY OF ORIGIN	OWN HOME	HOME OF A FRIEND OR RELATIVE	PLACE OF WORK	ANOTHER BUSINESS	HOTEL/MOTEL	OTHER	TOTAL
ALAMEDA	42.3%	29.4%	6.9%	6.9%	11.4%	3.1%	100.0%
CONTRA COSTA	46.9%	35.9%	4.7%	6.0%	4.1%	2.4%	100.0%
MARIN	34.1%	32.3%	3.1%	3.3%	22.3%	4.9%	100.0%
NAPA	33.9%	36.0%	0.4%	4.1%	23.9%	1.5%	100.0%
SAN FRANCISCO	19.8%	17.9%	7.6%	4.9%	45.2%	4.6%	100.0%
SAN MATEO	29.8%	26.7%	6.0%	4.7%	30.9%	1.9%	100.0%
SANTA CLARA	37.9%	26.0%	11.3%	8.4%	13.7%	2.7%	100.0%
SOLANO	44.6%	33.7%	5.9%	2.6%	5.7%	7.5%	100.0%
SONOMA	48.3%	26.4%	3.8%	3.4%	15.1%	3.0%	100.0%
BAY AREA	**32.3%**	**25.1%**	**7.2%**	**5.7%**	**24.1%**	**3.3%**	**100.0%**
OUT-OF-REGION	23.3%	54.6%	4.1%	4.2%	10.4%	3.4%	100.0%

TABLE 2.9

TYPE OF LOCATION AIR PARTY LEFT FOR AIRPORT

TYPE OF LOCATION AIR PARTY LEFT FOR AIRPORT	SAN FRANCISCO (SFO)	OAKLAND (OAK)	SAN JOSE (SJC)	BAY AREA
AIR PARTY'S OWN HOME	33.0%	43.9%	40.2%	39.7%
HOME OF A FRIEND OR RELATIVE	22.8%	25.7%	21.8%	23.6%
AIR PARTY'S OWN PLACE OF WORK	5.3%	7.3%	11.6%	8.2%
OTHER BUSINESS	4.1%	7.9%	8.4%	7.0%
HOTEL / MOTEL	31.2%	12.7%	15.3%	18.6%
OTHER	3.6%	2.5%	2.7%	2.9%
TOTAL	100.0%	100.0%	100.0%	100.0%

TABLE 2.10

ORIGINS OF AIR PARTIES BY AIRPORT AND FLIGHT DESTINATION

	SAN FRANCISCO (SFO)		OAKLAND (OAK)		SAN JOSE (SJC)	
COUNTY OF ORIGIN	CALIFORNIA	DOMESTIC AND INTERNATIONAL	CALIFORNIA	DOMESTIC AND INTERNATIONAL	CALIFORNIA	DOMESTIC AND INTERNATIONAL
ALAMEDA	1.6%	6.0%	3.5%	3.1%	0.5%	0.7%
CONTRA COSTA	0.6%	3.0%	1.7%	1.6%	0.1%	0.1%
MARIN	1.4%	3.0%	0.2%	0.1%	-	-
NAPA	0.4%	0.8%	0.1%	0.1%	-	-
SAN FRANCISCO	10.4%	16.9%	0.6%	0.3%	-	0.1%
SAN MATEO	4.5%	9.7%	0.1%	0.1%	0.2%	0.2%
SANTA CLARA	1.9%	6.7%	0.3%	0.2%	5.5%	6.6%
SOLANO	0.3%	1.3%	0.3%	0.3%	-	-
SONOMA	0.8%	1.7%	0.2%	0.1%	-	-
OUT-OF-REGION	0.2%	0.9%	0.2%	0.2%	0.4%	0.5%
TOTAL	22.0%	50.1%	7.3%	5.8%	6.7%	8.0%

TABLE 2.11a

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

ALAMEDA COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
Alameda	4.7%	4.6%	7.3%
Albany	1.7%	1.6%	1.8%
Berkeley	19.9%	18.4%	15.9%
Castro Valley	2.7%	1.4%	2.0%
Dublin	0.8%	1.7%	1.3%
Emeryville	0.0%	1.0%	1.4%
Fremont	9.3%	9.8%	11.8%
Hayward	5.9%	9.2%	6.7%
Livermore	5.5%	4.6%	2.0%
Montclair	0.1%	0.1%	-
Newark	1.4%	1.7%	2.0%
Oakland	30.8%	30.1%	22.9%
Piedmont	0.7%	1.8%	1.1%
Pleasanton	4.3%	3.9%	4.5%
San Leandro	5.2%	4.8%	3.9%
San Lorenzo	0.8%	1.1%	1.1%
Sunol	0.1%	-	-
Union City	3.2%	1.7%	2.8%
Other Alameda County	2.5%	2.4%	11.7%
TOTAL	100.0%	100.0%	100.0%

TABLE 2.11b

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

CONTRA COSTA COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
Alamo	2.5%	1.6%	1.4%
Antioch	4.6%	2.4%	2.8%
Brentwood	0.8%	-	0.3%
Byron	-	0.1%	-
Clayton	0.9%	0.6%	0.7%
Concord	15.7%	16.0%	12.0%
Crockett	0.4%	0.4%	-
Danville	6.1%	8.5%	4.6%
El Cerrito	1.5%	4.8%	4.1%
El Sobrante	2.0%	1.6%	0.1%
Hercules	0.5%	0.8%	0.6%
Kensington	0.5%	0.3%	-
Lafayette	4.8%	5.2%	4.2%
Martinez	4.3%	2.6%	4.7%
Moraga	6.3%	4.1%	4.1%
Mt. Diablo	0.1%	0.3%	-
Oakley	-	0.1%	0.2%
Orinda	3.7%	5.0%	4.0%
Pinole	2.8%	0.6%	2.2%
Pittsburg	1.7%	2.3%	3.0%
Pleasant Hill	5.9%	3.5%	7.1%
Richmond	8.0%	7.8%	9.1%
Rodeo	0.5%	0.7%	0.5%
San Pablo	1.7%	1.6%	1.6%
San Ramon	5.9%	8.3%	9.5%
Walnut Creek	18.8%	20.8%	14.0%
Other Contra Costa County	-	-	9.5%
TOTAL	100.0%	100.0%	100.0%

TABLE 2.11c

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

MARIN COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
Belvedere	1.3%	0.5%	1.5%
Corte Madera	4.3%	2.8%	2.7%
Fairfax	1.6%	0.5%	1.8%
Forest Knolls	-	0.7%	-
Greenbrae	3.6%	1.4%	-
Ignacio	1.1%	0.2%	-
Inverness	-	0.2%	-
Kentfield	2.1%	4.9%	-
Larkspur	0.7%	2.8%	8.6%
Marin City	1.3%	3.1%	-
Marinwood	-	0.5%	-
Mill Valley	12.1%	13.6%	10.1%
Muir Woods	-	0.7%	-
Nicasio	-	0.9%	-
Novato	10.6%	13.9%	9.8%
Olema	-	0.5%	-
Ross	3.4%	2.6%	1.0%
San Anselmo	5.8%	5.4%	5.0%
San Rafael	27.5%	28.8%	19.2%
Sausalito	12.0%	10.4%	24.5%
Sleepy Hollow	1.2%	-	-
Stinson Beach	-	0.5%	-
Tiburon	9.1%	4.9%	6.8%
Woodacre	0.8%	0.2%	-
Other Marin County	-	-	9.2%
TOTAL	100.0%	100.0%	100.0%

TABLE 2.11d

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

NAPA COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
American Canyon	-	-	0.5%
Angwin	0.9%	4.2%	-
Calistoga	6.8%	5.6%	5.2%
Lake Berryessa	-	2.7%	-
Napa	84.8%	75.0%	61.7%
St. Helena	7.5%	11.1%	7.4%
Yountville	-	1.4%	3.3%
Other Napa County	-	-	21.9%
TOTAL	**100.0%**	**100.0%**	**100.0%**

TABLE 2.11e

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

SAN FRANCISCO COUNTY

	PERCENT OF AIR PARTIES		
CITY OF ORIGIN	1980	1985	1990
San Francisco	100.0%	100.0%	100.0%
TOTAL	**100.0%**	**100.0%**	**100.0%**

TABLE 2.11f

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

SAN MATEO COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
Atherton	1.7%	0.2%	0.6%
Belmont	4.2%	4.4%	2.0%
Brisbane	1.4%	1.3%	-
Burlingame	7.5%	15.0%	19.4%
Colma	-	0.1%	-
Daly City	4.4%	4.5%	5.2%
East Palo Alto	-	0.5%	0.2%
El Granada	0.2%	-	-
Foster City	4.7%	4.0%	5.6%
Half Moon Bay	1.4%	1.1%	1.6%
Hillsborough	0.9%	1.8%	1.5%
La Honda	0.1%	-	-
Menlo Park	5.3%	7.4%	5.6%
Millbrae	5.2%	7.2%	6.2%
Montara	0.8%	0.3%	0.1%
Moss Beach	0.9%	0.4%	-
Pacifica	3.3%	2.1%	3.2%
Portola Valley	1.4%	1.0%	0.7%
Redwood City	7.8%	7.4%	5.4%
San Bruno	6.8%	7.0%	8.2%
San Carlos	3.2%	5.0%	5.8%
San Mateo	12.3%	13.8%	13.7%
South San Francisco	13.2%	6.9%	11.8%
Woodside	1.5%	1.0%	0.6%
Other San Mateo County	11.8%	7.6%	2.7%
TOTAL	100.0%	100.0%	100.0%

TABLE 2.11g

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

SANTA CLARA COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
Campbell	1.8%	1.5%	1.3%
Cupertino	3.9%	3.0%	3.3%
Gilroy	0.5%	0.8%	0.7%
Los Altos	3.1%	3.6%	2.8%
Los Altos Hills	0.6%	0.9%	0.8%
Los Gatos	3.1%	3.1%	2.7%
Milpitas	1.4%	2.6%	2.2%
Monte Sereno	0.1%	0.2%	0.5%
Morgan Hill	1.2%	1.1%	0.5%
Mountain View	5.2%	7.4%	5.3%
Palo Alto	14.5%	13.9%	14.5%
San Jose	38.8%	35.6%	29.4%
San Martin	-	0.4%	-
Santa Clara	9.4%	10.1%	7.8%
Satatoga	2.5%	2.3%	2.4%
Sunnyvale	12.0%	11.4%	10.7%
Other Santa Clara County	1.9%	2.1%	15.1%
TOTAL	100.0%	100.0%	100.0%

TABLE 2.11h

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

SOLANO COUNTY

	PERCENT OF AIR PARTIES		
CITY OF ORIGIN	1980	1985	1990
Benicia	5.2%	10.4%	10.8%
Dixon	1.2%	-	-
Fairfield	10.7%	19.4%	18.2%
Suisun City	3.7%	6.3%	3.3%
Vacaville	9.5%	13.9%	10.3%
Vallejo	21.5%	35.4%	39.3%
Other Solano County	48.2%	14.6%	18.1%
TOTAL	**100.0%**	**100.0%**	**100.0%**

TABLE 2.11i

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

SONOMA COUNTY

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1980	1985	1990
Agua Caliente	-	1.0%	-
Bodega Bay	2.9%	1.9%	-
Cloverdale	-	0.4%	1.8%
Cotati	3.1%	-	0.2%
Forestville	2.9%	1.0%	-
Fulton	-	0.4%	-
Geyserville	2.0%	-	-
Glen Ellen	1.1%	-	0.5%
Guernville	2.0%	0.4%	0.4%
Healdsburg	2.0%	-	3.9%
Jenner	-	0.8%	-
Monte Rio	-	0.8%	0.1%
Occidental	-	0.4%	-
Petaluma	11.3%	11.0%	20.7%
Rohnert Park	7.3%	7.2%	5.1%
Santa Rosa	48.7%	59.5%	38.8%
Sebastapol	6.8%	4.2%	4.3%
Sonoma	8.2%	11.0%	12.4%
Windsor	1.7%	-	-
Other Sonoma County	-	-	11.8%
TOTAL	100.0%	100.0%	100.0%

TABLE 2.11j

ORIGINS OF AIR PARTIES FOR CITIES IN BAY AREA COUNTIES 1980 - 1990

OUT OF REGION

CITY OF ORIGIN	PERCENT OF AIR PARTIES 1990
Santa Cruz	0.3%
Scotts Valley	2.0%
Watsonville	2.2%
Other Out-of-Region	95.5%
TOTAL	100.0%

Out of Region origins by city are not available prior to 1990.

TABLE 2.12

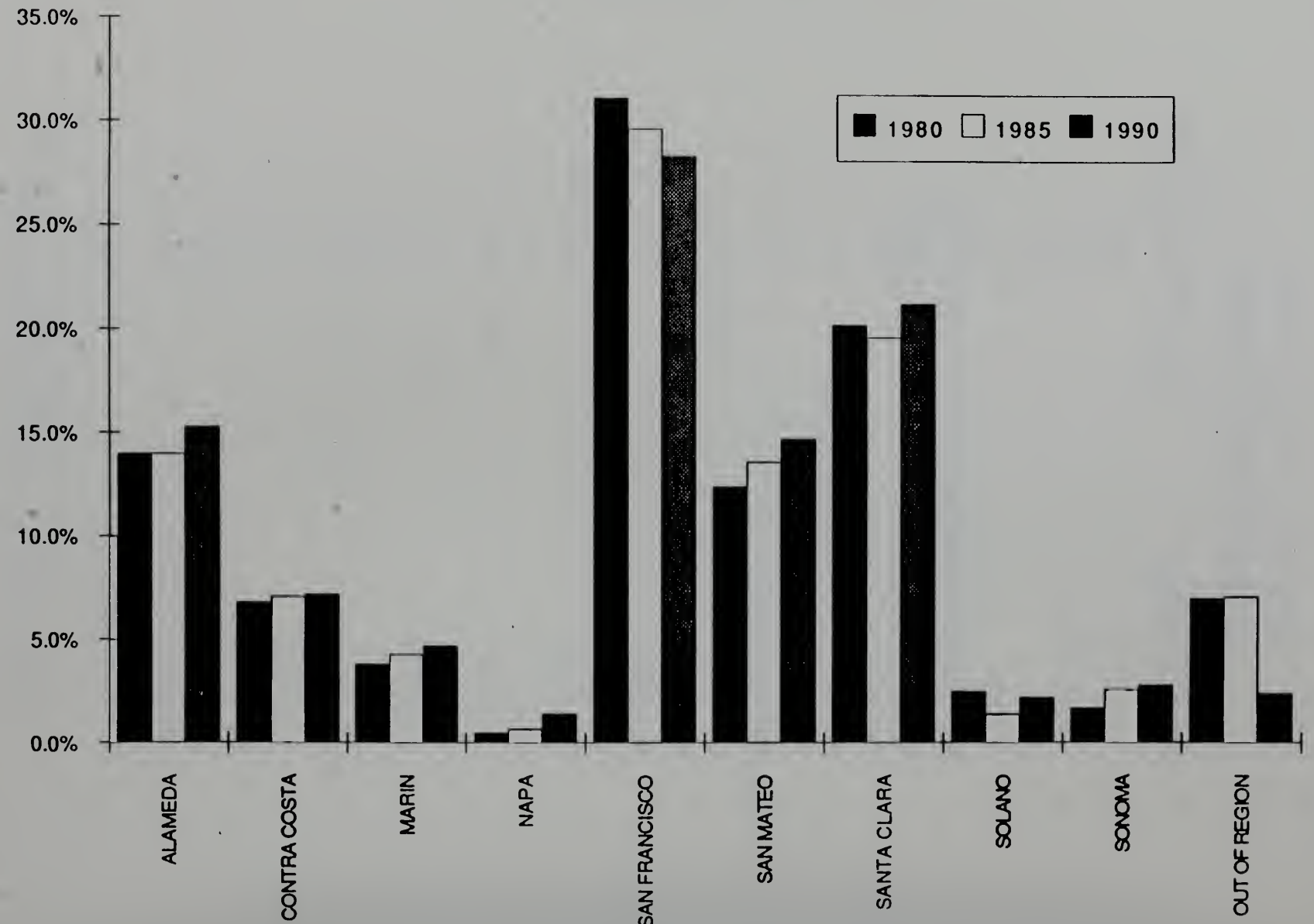
AIR PARTY ORIGINS FROM OUTSIDE THE BAY AREA *

COUNTY OF ORIGIN	PERCENT OF AIR PARTIES
SANTA CRUZ	34.8%
STANISLAUS	27.7%
YOLO	7.0%
MADERA	4.6%
KERN &KINGS	3.7%
MENDOCINO	3.0%
SISKIYOU	2.9%
SHASTA	2.7%
TUOLOMNE	2.3%
FRESNO	2.1%
SACRAMENTO	2.0%
SUTTER	2.0%
MONTEREY	1.1%
TEHEMA	0.9%
MARIPOSA	0.7%
LASSEN	0.6%
TULARE	0.4%
SAN JOAQUIN	0.3%
YUBA	0.3%
MERCED	0.3%
INYO	0.2%
EL DORADO	0.1%
HUMBOLT	0.1%
LAKE	0.1%
NEVADA	0.1%
TOTAL	**100.0%**

* Air party origins from outside the nine-county Bay Area account for only 2.4 percent of all air party origins.

FIGURE 2.1

COUNTY OF ORIGIN 1980 - 1990



- PART IV -

- SECTION 3 -

- GROUND TRANSPORTATION -

TABLE 3.1

GROUND TRANSPORTATION MODE BY RESIDENCE AND TRIP PURPOSE

	BAY AREA RESIDENTS		NON-RESIDENTS	
	BUSINESS	NON-BUSINESS	BUSINESS	NON-BUSINESS
PRIVATE CAR	75.6%	76.2%	22.1%	48.0%
RENTAL CAR	4.3%	1.4%	43.7%	23.2%
AC-SAMTRANS-SC TRANSIT	1.0%	1.1%	0.5%	1.2%
"AIRPORTER" EXPRESS BUSES	3.4%	5.5%	4.0%	4.5%
OTHER TRANSIT (Incl. AirBART)	1.6%	2.2%	2.2%	2.1%
TAXI	5.0%	3.2%	8.5%	4.8%
HOTEL/MOTEL COURTESY VAN	0.5%	0.9%	5.7%	4.5%
LUXURY LIMOUSINE	1.9%	1.7%	3.1%	1.6%
ON CALL VAN SERVICE	6.5%	6.9%	8.1%	7.7%
CHARTER/TOUR BUS	0.0%	0.4%	1.0%	1.5%
OTHER	0.2%	0.5%	1.1%	1.0%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Business trips include trips for conventions, conferences and for commercial and military pu

TABLE 3.2

GROUND TRANSPORTATION MODE BY AIRPORT

(Sorted by mode share size)

	ALL BAY AREA AIRPORTS	SAN FRANCISCO (SFO)	OAKLAND (OAK)	SAN JOSE (SJC)
PRIVATE CAR	**52.2%**	46.1%	69.0%	66.1%
RENTAL CAR	**20.1%**	19.6%	16.9%	24.7%
ON CALL VAN SERVICE	**7.4%**	9.9%	1.5%	1.4%
"AIRPORTER" EXPRESS BUSES	**4.8%**	6.5%	1.2%	0.3%
TAXI	**5.3%**	6.1%	3.0%	3.4%
HOTEL/MOTEL COURTESY VAN	**3.4%**	4.0%	1.5%	2.2%
OTHER TRANSIT (Incl. AirBART)	**2.2%**	2.1%	4.6%	0.4%
LUXURY LIMOUSINE	**2.0%**	2.6%	0.6%	0.6%
AC-SAMTRANS-SC TRANSIT	**1.0%**	1.2%	0.7%	0.5%
CHARTER/TOUR BUS	**0.9%**	1.2%	0.2%	0.1%
OTHER	**0.7%**	0.8%	0.8%	0.2%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

TABLE 3.3

GROUND TRANSPORTATION MODE BY RESIDENCE STATUS

	SAN FRANCISCO INTERNATIONAL AIRPORT		OAKLAND INTERNATIONAL AIRPORT		SAN JOSE INTERNATIONAL AIRPORT	
	BAY AREA RESIDENTS	NON-RESIDENTS	BAY AREA RESIDENTS	NON-RESIDENTS	BAY AREA RESIDENTS	NON-RESIDENTS
PRIVATE CAR	69.9%	33.3%	84.8%	55.3%	90.0%	49.9%
RENTAL CAR	2.4%	29.0%	2.5%	29.4%	1.9%	40.3%
AC-SAMTRANS-SC TRANSIT	1.3%	1.1%	0.7%	0.6%	0.5%	0.4%
"AIRPORTER" EXPRESS BUSES	7.1%	6.2%	1.1%	1.3%	0.1%	0.4%
AirBART	-	-	4.9%	3.4%	-	-
OTHER TRANSIT	2.1%	2.2%	0.3%	0.7%	0.1%	0.5%
TAXI	3.7%	7.3%	2.7%	3.3%	5.1%	2.3%
HOTEL/MOTEL COURTESY VAN	0.9%	5.6%	0.3%	2.6%	0.6%	3.3%
LUXURY LIMOSINE	2.3%	2.8%	0.6%	0.5%	1.0%	0.4%
ON CALL VAN SERVICE	9.6%	10.0%	1.4%	1.5%	0.6%	1.9%
CHARTER/TOUR BUS	0.4%	1.6%	0.1%	0.4%	0.0%	0.1%
OTHER	0.4%	0.9%	0.5%	1.0%	0.1%	0.3%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 3.4

TRENDS IN GROUND TRANSPORTATION MODE SHARES 1975 - 1990

SAN FRANCISCO INTERNATIONAL AIRPORT

	1975	1980	1985	1990
PRIVATE CAR	51.3%	48.5%	47.1%	46.1%
RENTAL CAR	12.5%	12.8%	19.5%	19.6%
AC-SAMTRANS-SC TRANSIT	4.3%	4.2%	0.9%	1.2%
SONOMA COUNTY AIRPORT EXPRESS	-	-	0.1%	0.3%
SONOMA AIRPORTER	-	-	0.2%	-
SFO AIRPORTER	13.6%	12.2%	6.0%	2.0%
MARIN AIRPORTER	-	0.9%	1.7%	1.4%
EVANS AIRPORTER	-	0.1%	0.3%	0.6%
SANTA ROSA AIRPORTER	-	0.3%	1.3%	0.8%
TRAVIS EXPRESS	-	-	-	0.1%
AIRPORT CONNECTION	-	0.7%	1.0%	0.7%
SC AIRPORT EXPRESS	-	-	-	0.5%
OTHER TRANSIT	-	-	1.2%	2.1%
TAXI	9.5%	9.5%	10.8%	6.1%
HOTEL/MOTEL COURTESY VAN	3.7%	4.6%	5.8%	4.0%
LUXURY LIMOUSINE	2.2%	3.1%	2.3%	2.6%
ON CALL VAN SERVICE	-	-	-	9.9%
CHARTER/TOUR BUS	-	1.4%	0.7%	1.2%
MILITARY BUS	-	-	1.0%	0.1%
OTHER	2.9%	1.7%	-	0.6%
TOTAL	100.0%	100.0%	100.0%	100.0%

TABLE 3.5

TRENDS IN GROUND TRANSPORTATION MODE SHARES 1975 - 1990

OAKLAND INTERNATIONAL AIRPORT

	1975	1980	1985	1990
PRIVATE CAR	79.3%	76.7%	70.3%	69.0%
RENTAL CAR	8.1%	8.4%	15.0%	16.9%
AC-SAMTRANS-SC TRANSIT	5.2%	1.3%	1.0%	0.7%
SONOMA COUNTY AIRPORT EXPRESS	-	-	-	0.1%
SFO AIRPORTER	-	0.2%	-	0.1%
MARIN AIRPORTER	-	-	-	0.1%
EVANS AIRPORTER	-	-	-	*
SANTA ROSA AIRPORTER	-	-	-	0.1%
OAKLAND AIRPORT EXPRESS	-	-	0.4%	0.4%
TRAVIS EXPRESS	-	-	-	0.1%
AIRPORT CONNECTION	-	0.3%	-	0.2%
SC AIRPORT EXPRESS	-	-	-	0.1%
OAKLAND AirBART	-	6.5%	3.2%	4.1%
OTHER TRANSIT	1.3%	-	1.2%	0.5%
TAXI	2.6%	3.4%	5.0%	3.0%
HOTEL/MOTEL COURTESY VAN	2.3%	1.9%	2.5%	1.5%
LUXURY LIMOUSINE	0.2%	0.7%	0.6%	0.6%
ON CALL VAN SERVICE	-	-	-	1.5%
CHARTER/TOUR BUS	-	-	0.3%	0.2%
MILITARY BUS	-	-	-	0.3%
OTHER	1.0%	0.6%	0.5%	0.4%
TOTAL	100.0%	100.0%	100.0%	100.0%

* Less than 0.1 percent

TABLE 3.6

TRENDS IN GROUND TRANSPORTATION MODE SHARES 1975 - 1990

SAN JOSE INTERNATIONAL AIRPORT

	1975	1980	1985	1990
PRIVATE CAR	84.6%	78.2%	72.1%	66.1%
RENTAL CAR	7.9%	14.2%	22.4%	24.7%
AC-SAMTRANS-SC TRANSIT	0.5%	0.7%	0.3%	0.5%
GREYHOUND	-	-	0.2%	-
PEERLESS	-	-	0.2%	-
AIRPORT LIMOUSINE	0.7%	-	-	-
AIRPORT CONNECTION	-	-	-	0.1%
SANTA CLARA AIPORT EXPRESS	-	-	-	0.2%
OTHER TRANSIT	-	-	-	0.4%
TAXI	2.2%	3.1%	2.6%	3.4%
HOTEL/MOTEL COURTESY VAN	1.6%	1.5%	1.5%	2.2%
LUXURY LIMOUSINE	1.2%	0.8%	0.4%	0.6%
ON CALL VAN SERVICE	-	-	-	1.4%
CHARTER/TOUR BUS	-	0.1%	0.2%	0.1%
OTHER	1.3%	1.4%	0.1%	0.2%
TOTAL	100.0%	100.0%	100.0%	100.0%

TABLE 3.7

GROUND TRANSPORTATION MODE SHARE BY COUNTY OF ORIGIN

SAN FRANCISCO INTERNATIONAL AIRPORT

	ALAMEDA	CONTRA COSTA	MARIN	NAPA	SAN FRANCISCO	SAN MATEO	SANTA CLARA	SOLANO	SONOMA	OUT-OF REGION
PRIVATE CAR	64.8%	71.8%	47.1%	40.7%	29.1%	55.8%	60.8%	60.9%	41.1%	75.4%
RENTAL CAR	16.4%	10.4%	11.8%	26.4%	18.0%	19.7%	28.0%	14.2%	15.0%	22.3%
AC-SAMTRANS-SC TRANSIT	1.6%	1.3%	0.4%	-	1.7%	0.8%	0.9%	1.0%	-	-
SONOMA COUNTY AIRPORTER	-	-	-	-	-	0.0%	-	-	7.9%	-
SFO AIRPORTER	1.0%	0.9%	5.3%	-	4.2%	0.3%	-	1.0%	1.3%	-
MARIN AIRPORTER	-	-	23.5%	-	0.1%	0.1%	-	-	1.9%	-
EVANS AIRPORTER	-	-	-	24.4%	-	-	-	5.4%	-	-
SANTA ROSA AIRPORTER	-	-	0.3%	1.3%	-	-	-	-	14.3%	-
OAKLAND AIRPORT EXPRESS	0.1%	-	-	-	-	0.1%	-	-	-	-
TRAVIS EXPRESS	-	-	-	-	-	-	-	4.6%	-	-
AIRPORT CONNECTION	2.5%	0.7%	0.4%	-	0.9%	0.2%	0.6%	-	0.6%	-
SANTA CLARA AIRPORT EXPRESS	0.2%	-	0.3%	-	0.5%	-	0.7%	-	4.6%	0.8%
OAKLAND AIR-BART	-	-	-	-	-	-	-	-	-	-
OTHER TRANSIT	2.2%	2.0%	0.4%	1.3%	2.7%	1.6%	0.7%	1.9%	1.9%	-
TAXI	2.0%	1.3%	2.9%	-	13.1%	3.5%	1.2%	-	1.7%	-
HOTEL/MOTEL COURTESY VAN	-	1.2%	0.2%	1.3%	2.5%	12.3%	1.4%	-	0.6%	-
LUXURY LIMOUSINE	1.5%	2.3%	1.6%	2.5%	4.5%	0.4%	3.3%	1.9%	0.6%	-
ON CALL VAN SERVICE	6.6%	5.1%	5.2%	1.5%	19.9%	4.3%	2.2%	7.1%	4.6%	-
CHARTER/TOUR BUS	0.5%	2.5%	0.3%	-	2.2%	0.1%	0.2%	-	1.9%	1.5%
MILITARY BUS	-	-	-	-	0.1%	-	-	1.9%	1.3%	-
OTHER	0.6%	0.4%	0.2%	0.7%	0.6%	0.7%	-	-	0.6%	-
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

TABLE 3.8

GROUND TRANSPORTATION MODE SHARE BY COUNTY OF ORIGIN

OAKLAND INTERNATIONAL AIRPORT

	ALAMEDA	CONTRA COSTA	MARIN	NAPA	SAN FRANCISCO	SAN MATEO	SANTA CLARA	SOLANO	SONOMA	OUT-OF REGION
PRIVATE CAR	69.5%	80.0%	72.1%	55.9%	41.3%	66.4%	77.9%	80.9%	59.7%	73.1%
RENTAL CAR	14.3%	11.2%	18.4%	36.6%	18.0%	24.5%	17.7%	10.6%	21.4%	19.7%
AC-SAMTRANS-SC TRANSIT	0.9%	0.4%	-	-	1.4%	0.8%	0.4%	0.3%	-	0.4%
SONOMA COUNTY AIRPORTER	-	-	-	-	-	-	-	-	3.0%	-
SFO AIRPORTER	0.1%	0.1%	-	-	1.0%	-	-	-	-	-
MARIN AIRPORTER	-	0.1%	0.7%	-	-	-	-	0.3%	-	-
EVANS AIRPORTER	-	-	-	1.1%	-	-	-	-	-	-
SANTA ROSA AIRPORTER	-	-	-	-	-	-	-	-	5.0%	-
OAKLAND AIRPORT EXPRESS	0.2%	0.4%	-	-	0.5%	0.8%	-	-	3.5%	-
TRAVIS EXPRESS	-	-	-	-	-	-	-	1.0%	-	-
AIRPORT CONNECTION	0.2%	0.4%	-	-	0.5%	0.8%	-	-	-	0.5%
SC AIPORT EXPRESS	0.1%	0.1%	-	-	-	-	-	-	3.4%	-
OAKLAND AIR-BART	4.1%	2.9%	-	-	20.9%	3.0%	1.8%	2.1%	0.6%	4.3%
OTHER TRANSIT	0.2%	0.6%	-	3.2%	1.8%	-	-	0.6%	-	0.5%
TAXI	4.5%	0.7%	4.0%	1.1%	9.9%	-	-	0.6%	-	0.8%
HOTEL/MOTEL COURTESY VAN	2.7%	0.3%	-	-	0.4%	-	1.0%	-	-	-
LUXURY LIMOUSINE	0.6%	0.7%	0.6%	0.9%	0.7%	1.0%	-	0.9%	0.0%	0.4%
ON CALL VAN SERVICE	1.2%	1.9%	2.1%	1.1%	2.7%	2.5%	0.4%	0.7%	2.9%	-
CHARTER/TOUR BUS	0.3%	0.1%	-	-	0.7%	-	-	0.7%	0.6%	-
MILITARY BUS	0.6%	-	-	-	-	-	0.5%	0.9%	-	-
OTHER	0.4%	0.3%	2.2%	-	0.4%	-	0.4%	0.4%	-	0.4%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 3.9

GROUND TRANSPORTATION MODE SHARE BY COUNTY OF ORIGIN

SAN JOSE INTERNATIONAL AIRPORT

	ALAMEDA	CONTRA COSTA	MARIN	NAPA	SAN FRANCISCO	SAN MATEO	SANTA CLARA	SOLANO	SONOMA	OUT-OF REGION
PRIVATE CAR	73.1%	68.1%	69.5%	70.7%	37.6%	72.0%	69.4%	80.5%	100.0%	79.1%
RENTAL CAR	23.1%	30.4%	20.4%	29.3%	48.9%	18.0%	21.8%	-	-	15.0%
AC-SAMTRANS-SC TRANSIT	-	-	-	-	1.8%	0.0%	0.4%	-	-	0.3%
AIRPORT CONNECTION	-	-	-	-	-	-	-	-	-	0.3%
SC AIPORT EXPRESS	-	-	-	-	-	-	-	-	-	0.6%
OAKLAND AIR-BART	-	-	-	-	-	-	-	-	-	-
OTHER TRANSIT	0.2%	-	-	-	-	0.7%	0.2%	-	-	1.2%
TAXI	1.2%	-	10.2%	-	7.3%	4.3%	4.1%	19.5%	-	1.1%
HOTEL/MOTEL COURTESY VAN	0.7%	-	-	-	1.8%	-	2.3%	-	-	0.3%
LUXURY LIMOUSINE	0.7%	-	-	-	0.8%	2.3%	0.6%	-	-	0.6%
ON CALL VAN SERVICE	0.7%	1.4%	-	-	1.8%	1.7%	0.9%	-	-	1.7%
CHARTER/TOUR BUS	-	-	-	-	-	-	0.1%	-	-	-
MILITARY BUS	-	-	-	-	-	-	-	-	-	-
OTHER	0.2%	-	-	-	-	1.0%	0.1%	-	-	-
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 3.10

GROUND TRANSPORTATION MODE CHOICE BY INCOME

TOTAL HOUSEHOLD INCOME FOR 1989

	Less Than $12,500	$12,500-$19,999	$20,000-$29,999	$30,000-$39,999	$40,000-$49,999	$50,000-$74,999	$75,000-$99,999	Over $100,000	ALL INCOME GROUPS
PRIVATE CAR	62.6%	60.2%	58.7%	52.9%	52.8%	50.2%	48.7%	46.6%	**51.8%**
RENTAL CAR	**8.7%**	9.1%	10.0%	16.6%	17.7%	23.4%	26.1%	27.7%	**20.6%**
AC-SAMTRANS-SC TRANSIT	**2.9%**	3.1%	1.4%	0.8%	1.4%	1.1%	0.5%	0.2%	**1.0%**
AIRPORTER EXPRESS BUSES	**4.9%**	7.1%	5.5%	5.8%	6.1%	4.1%	4.7%	3.5%	**4.8%**
OAKLAND AIR-BART	1.7%	0.7%	0.5%	0.7%	0.6%	0.4%	0.6%	0.3%	**0.6%**
OTHER TRANSIT	0.7%	2.0%	2.1%	2.5%	1.3%	1.3%	1.8%	1.2%	**1.6%**
TAXI	**4.4%**	5.1%	3.4%	4.0%	4.6%	4.9%	4.8%	8.7%	**5.3%**
HOTEL/MOTEL COURTESY VAN	1.7%	1.6%	2.6%	4.2%	4.4%	4.0%	2.9%	3.6%	**3.5%**
LUXURY LIMOUSINE	**1.2%**	1.7%	1.1%	1.5%	1.9%	1.9%	2.6%	2.9%	**2.0%**
ON CALL VAN SERVICE	**9.0%**	5.9%	12.0%	9.4%	8.4%	7.6%	6.4%	4.5%	**7.5%**
CHARTER/TOUR BUS	1.6%	0.8%	1.3%	1.1%	0.4%	0.7%	0.5%	0.4%	**0.7%**
MILITARY BUS	0.1%	0.6%	0.8%	0.1%	0.1%	-	-	-	**0.1%**
OTHER	0.5%	2.0%	0.6%	0.4%	0.3%	0.6%	0.2%	0.4%	**0.5%**
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

TABLE 3.11

GROUND TRANSPORTATION MODE CHOICE BY AGE

	AGE OF RESPONDENT						
	19 OR YOUNGER	20 - 29 YEARS	30 -39 YEARS	40 -49 YEARS	50 - 65 YEARS	OVER 65 YEARS	ALL AGE GROUPS
PRIVATE CAR	68.9%	51.7%	47.9%	48.2%	50.6%	60.4%	51.6%
RENTAL CAR	8.2%	14.6%	24.4%	26.8%	20.9%	7.4%	19.8%
AC-SAMTRANS-SC TRANSIT	1.3%	1.7%	0.7%	0.7%	0.8%	0.8%	1.0%
AIRPORTER EXPRESS BUSES	8.5%	9.9%	4.4%	1.8%	5.2%	9.2%	5.9%
OTHER TRANSIT (Incl. AirBART)	2.3%	2.3%	1.9%	2.4%	2.3%	1.6%	2.2%
TAXI	2.5%	4.6%	6.4%	5.1%	6.5%	4.0%	5.3%
HOTEL/MOTEL COURTESY VAN	1.8%	2.4%	3.6%	3.9%	4.0%	3.7%	3.3%
LUXURY LIMOUSINE	1.1%	1.5%	1.9%	3.0%	1.8%	2.7%	2.0%
ON CALL VAN SERVICE	3.3%	9.3%	7.5%	6.9%	6.5%	7.6%	7.3%
CHARTER/TOUR BUS	1.2%	0.8%	0.8%	0.8%	0.8%	1.7%	0.9%
MILITARY BUS	0.1%	0.4%	-	-	0.1%	-	0.1%
OTHER	0.9%	0.6%	0.5%	0.4%	0.5%	0.8%	0.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 3.12

FOR AIR PARTIES TAKING TRANSIT TO THE AIRPORT, MEANS BY WHICH TRANSIT SERVICE WAS REACHED

HOW AIR PARTY REACHED TRANSIT	SAN FRANCISCO INTERNATIONAL AIRPORT	OAKLAND INTERNATIONAL AIRPORT	SAN JOSE INTERNATIONAL AIRPORT
WALK OR BICYCLE	47.2%	60.4%	35.2%
AUTO - DROPPED OF BY OTHERS	24.2%	5.2%	16.2%
AUTO - DROVE SELF AND PARKED	10.7%	2.0%	10.2%
TAXI	6.6%	2.8%	18.1%
BART	5.6%	25.6%	0.0%
BUS	5.3%	3.8%	17.6%
CALTRAIN	0.4%	0.2%	2.8%
TOTAL	100.0%	100.0%	100.0%

NOTE:

Respondents were asked how they arrived at the airport to determine their ground transportation mode. If they used public or private transit, they were also asked how they reached the transit services. In some cases, the air party may have started their trip using one form of transit and then transferred to another to complete their journey to the airport.

TABLE 3.13

AIR PARTY SIZE, LUGGAGE AND ACCOMPANIERS BY GROUND TRANSPORTATION MODE

GROUND TRANSPORTATION MODE	Average Air Party Size	Average Number of Bags per Party	Average Number of People Who Came to See Party Off
PRIVATE CAR	1.67	2.98	1.02
RENTAL CAR	2.04	3.49	0.18
PUBLIC TRANSIT	2.07	2.96	0.23
AC-SAMTRANS-SC TRANSIT	1.58	2.27	0.07
OAKLAND AIR-BART	1.26	1.85	0.20
OTHER TRANSIT	2.63	3.72	0.33
"AIRPORTER" EXPRESS BUSES	1.63	2.76	0.09
Sonoma County Airporter	1.42	2.12	0.07
SFO Airporter	1.76	2.91	0.05
Marin Airporter	1.39	2.61	0.07
Evans Airporter	1.54	2.98	0.12
Santa Rosa Airporter	1.46	2.37	0.19
Oakland Airport Express	1.32	1.99	0.07
Travis Express	1.84	3.99	0.00
Airport Connection	1.41	2.64	0.11
SC Airport Express	2.53	3.37	0.09
TAXI	1.91	2.91	0.11
ON-CALL VAN SERVICE	1.56	2.92	0.10
LUXURY LIMOUSINE	2.15	3.85	0.15
HOTEL COURTESY VAN	2.29	3.76	0.09
CHARTER OR TOUR BUS	13.54	12.94	0.18
MILITARY BUS	14.27	6.00	0.12
OTHER	3.68	4.06	0.67

TABLE 3.14

GROUND TRANSPORTATION MODE
BY FLIGHT DESTINATION

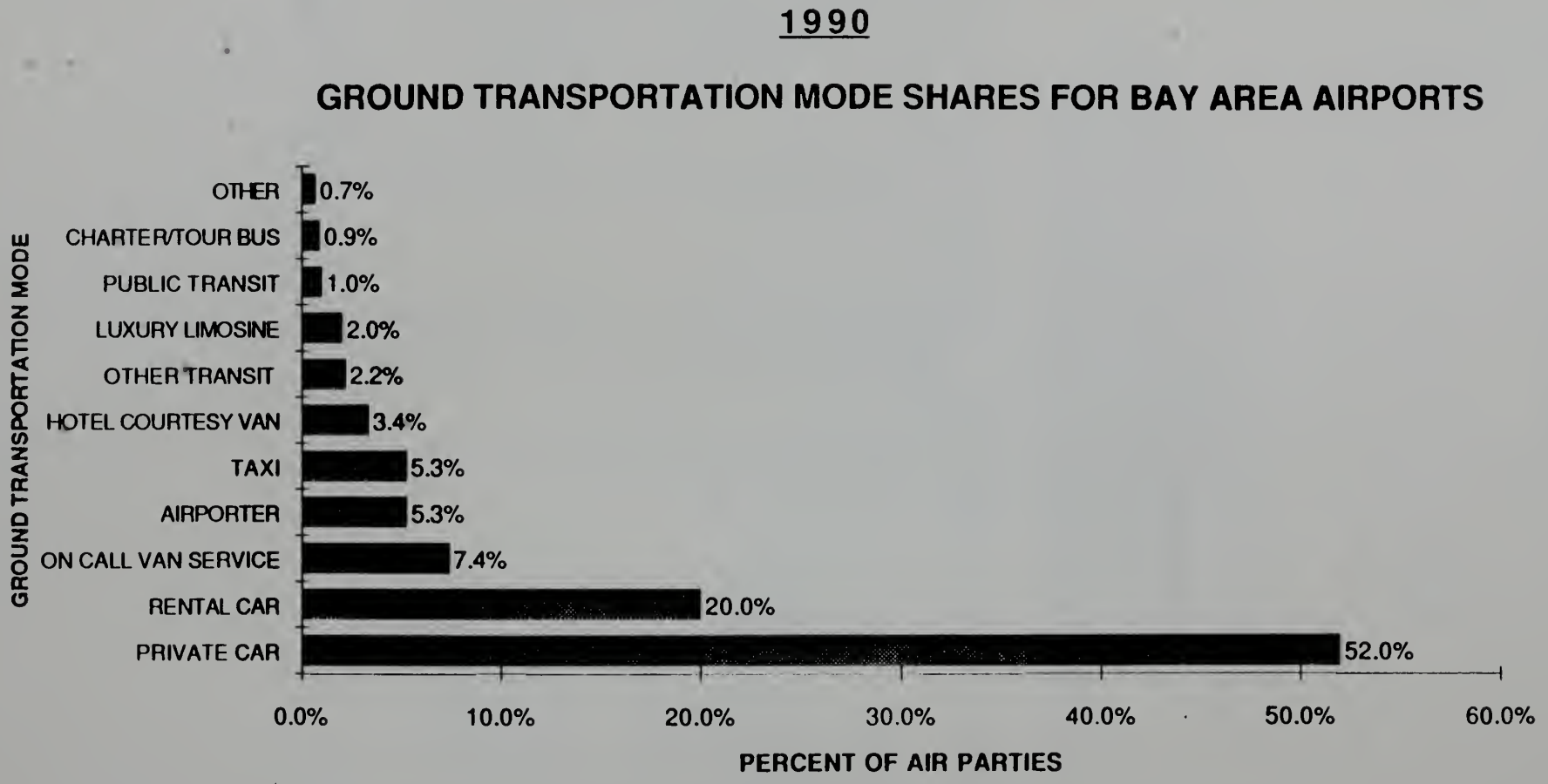
	FLIGHT DESTINATION		
GROUND TRANSPORTATION MODE	CALIFORNIA	DOMESTIC	INTERNATIONAL
PRIVATE CAR	55.0%	51.2%	43.7%
RENTAL CAR	18.9%	21.0%	17.8%
AC-SAMTRANS-SC TRANSIT	1.6%	0.6%	0.8%
AIRPORT EXPRESS BUSES	4.7%	5.6%	6.9%
OTHER TRANSIT	1.4%	1.7%	3.5%
ON-CALL VAN SERVICE	7.8%	7.1%	9.6%
TAXI	5.8%	5.0%	5.2%
HOTEL COURTESY VAN	2.3%	3.9%	5.1%
LUXURY LIMOUSINE	1.7%	2.2%	2.2%
CHARTER OR TOUR BUSES	0.5%	0.9%	3.7%
OTHER	0.3%	0.8%	1.4%
TOTAL	100.0%	100.0%	100.0%

TABLE 3.15

GROUND TRANSPORTATION MODE BY TYPE OF LOCATION FROM WHICH AIR PARTY LEFT FOR AIRPORT

	RESIDENCE	BUSINESS	HOTEL	OTHER
PRIVATE CAR	74.8%	43.8%	8.3%	28.5%
RENTAL CAR	7.0%	34.5%	42.3%	23.8%
AC-SAMTRANS-SC TRANSIT	1.0%	1.1%	0.5%	4.0%
AIRPORTER EXPRESS BUSES	5.3%	3.9%	5.9%	8.7%
OTHER TRANSIT	1.0%	1.0%	3.4%	2.6%
ON-CALL VAN SERVICE	5.5%	6.5%	11.3%	15.0%
TAXI	2.9%	6.8%	9.7%	6.9%
HOTEL COURTESY VAN	0.5%	0.4%	11.7%	0.4%
LUXURY LIMOUSINE	1.3%	0.9%	4.1%	1.5%
CHARTER OR TOUR BUSES	0.3%	0.6%	2.1%	4.0%
OTHER	0.4%	0.6%	0.6%	4.7%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

FIGURE 3.1


1990
GROUND TRANSPORTATION MODE SHARES FOR BAY AREA AIRPORTS
GROUND TRANSPORTATION MODE
OTHER
CHARTER/TOUR BUS
PUBLIC TRANSIT
LUXURY LIMOSINE
OTHER TRANSIT
HOTEL COURTESY VAN
TAXI
AIRPORTER
ON CALL VAN SERVICE
RENTAL CAR
PRIVATE CAR
0.7%
0.9%
1.0%
2.0%
2.2%
3.4%
5.3%
5.3%
7.4%
20.0%
52.0%
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
PERCENT OF AIR PARTIES

- PART IV -

- SECTION 4 -

- PARKING -

TABLE 4.1

WHERE CARS ARE PARKED AT BAY AREA AIRPORTS

PARKING LOCATION		SAN FRANCISCO AIRPORT	OAKLAND AIRPORT	SAN JOSE AIRPORT
MAIN GARAGE	(SFO)	67.6%	-	-
LONG TERM LOT		18.8	35.3	40.7
SHORT TERM LOT		-	45.7	58.8
ECONOMY LOT	(OAK)	-	6.9	-
Park and Fly	(OAK)	-	7.3	-
Air Park	(OAK)	-	2.3	-
E-Z Park	(OAK)	-	0.5	-
OFF-AIRPORT LOTS	(Subtotal)	13.6	10.1	0.5
OTHER PARKING FACILITIES		-	2.0	-
TOTAL		**100.0%**	**100.0%**	**100.0%**

TABLE 4.2

FOR AIR PARTIES DRIVING TO THE AIRPORT, WERE CARS PARKED AT THE AIRPORT OR DRIVEN AWAY BY OTHERS 1985 - 1990

	SAN FRANCISCO INTERNATIONAL AIRPORT		OAKLAND INTERNATIONAL AIRPORT		SAN JOSE INTERNATIONAL AIRPORT	
	1985	1990	1985	1990	1985	1990
CAR PARKED FOR DURATION OF OF AIR PARTY'S TRIP	25.6%	18.6%	28.5%	24.4%	28.6%	20.7%
CAR PARKED AT AIRPORT, THEN DRIVEN AWAY BY OTHERS	22.3	33.6	33.3	32.9	33.9	34.3
AIR PARTY DROPPED OFF AT CURB, THEN CAR DRIVEN AWAY BY OTHERS	52.1	47.8	38.2	42.6	37.5	45.0
TOTAL	100%	100%	100%	100%	100%	100%

TABLE 4.3

PARKING SEQUENCE OF AIR PARTIES USING PRIVATE CARS FOR THEIR TRIP TO THE AIRPORT
1985 - 1990

	SAN FRANCISCO INTERNATIONAL AIRPORT		OAKLAND INTERNATIONAL AIRPORT		SAN JOSE INTERNATIONAL AIRPORT	
	1985	1990	1985	1990	1985	1990
WENT DIRECTLY TO PARKING LOT	67.0%	41.3%	49.8%	43.6%	69.2%	43.2%
DROPPED AIR PARTY OFF AT CURB FIRST	33.0	58.7	50.2	56.4	30.8	56.8
TOTAL	100%	100%	100%	100%	100%	100%

- PART IV -

- SECTION 5 -

- TRIP PURPOSE -

TABLE 5.1

TRIP PURPOSE BY AIRPORT

	SAN FRANCISCO INTERNATIONAL AIRPORT	OAKLAND INTERNATIONAL AIRPORT	SAN JOSE INTERNATIONAL AIRPORT	ALL BAY AREA AIRPORTS
CONVENTION AND CONFERENCE	3.0%	2.6%	1.8%	2.4%
BUSINESS	27.3%	32.9%	44.2%	35.1%
MILITARY LEAVE	1.0%	1.6%	0.2%	1.0%
BUSINESS TRIPS	31.3%	37.1%	46.2%	38.5%
TRAVEL-SCHOOL	1.8%	2.1%	1.2%	1.7%
FAMILY EMERGENCY	1.3%	2.6%	1.9%	2.0%
VACATION	42.8%	29.1%	24.0%	31.2%
VISIT FRIENDS/FAMILY	20.3%	26.7%	24.1%	24.1%
OTHER	2.5%	2.4%	2.6%	2.5%
NON-BUSINESS TRIPS	68.7%	62.9%	53.8%	61.5%
TOTAL	100.0%	100.0%	100.0%	100.0%

TABLE 5.2

TRIP PURPOSE BY COUNTY OF ORIGIN

COUNTY OF ORIGIN	BUSINESS TRIP	NON-BUSINESS TRIP
ALAMEDA	14.3%	16.0%
CONTRA COSTA	7.0%	7.4%
MARIN	4.4%	4.8%
NAPA	1.1%	1.6%
SAN FRANCISCO	28.8%	27.6%
SAN MATEO	12.9%	15.4%
SANTA CLARA	25.9%	19.1%
SOLANO	1.7%	2.4%
SONOMA	2.0%	3.0%
BAY AREA (Subtotal)	98.2%	97.3%
SANTA CRUZ	0.7%	0.9%
STANISLAUS	0.4%	0.7%
OTHERS COMBINED	0.7%	1.2%
OUTSIDE REGION (Subtotal)	1.8%	2.7%
TOTAL	100.0%	100.0%

NOTE:

BUSINESS TRIPS include travel for conventions and conferences, and for commercial and military purposes.

TABLE 5.3

TRIP PURPOSE BY COUNTY OF ORIGIN

COUNTY OF ORIGIN	Convention/ Conference	Business Trip	Travel to or from School	Personal/ Family Emergency	Vacation	Visit Friends/ Relatives	Military Leave/ Travel	Other	TOTAL
BAY AREA COUNTIES									
ALAMEDA	1.9%	29.5%	3.3%	1.6%	33.9%	25.7%	1.5%	2.7%	100.0%
CONTRA COSTA	3.9%	29.2%	2.3%	1.9%	31.5%	27.9%	1.0%	2.4%	100.0%
MARIN	3.4%	30.3%	2.1%	2.9%	35.0%	25.2%	0.0%	0.9%	100.0%
NAPA	2.3%	25.5%	0.9%	2.7%	37.3%	29.7%	0.0%	1.5%	100.0%
SAN FRANCISCO	3.9%	31.5%	0.6%	0.7%	42.6%	17.4%	1.0%	2.3%	100.0%
SAN MATEO	2.4%	28.4%	2.1%	1.5%	42.0%	20.8%	0.6%	2.2%	100.0%
SANTA CLARA	1.9%	40.2%	1.7%	2.0%	27.5%	23.1%	0.5%	3.1%	100.0%
SOLANO	0.1%	22.9%	0.8%	2.9%	38.8%	28.2%	4.7%	1.6%	100.0%
SONOMA	1.6%	24.0%	2.1%	1.5%	40.1%	27.2%	1.7%	1.7%	100.0%
ALL BAY AREA COUNTIES	2.7%	31.9%	1.7%	1.5%	36.4%	22.3%	0.9%	2.4%	100.0%
COUNTIES OUTSIDE BAY AREA									
SANTA CRUZ	1.7%	29.5%	0.3%	3.5%	32.7%	29.9%	-	2.5%	100.0%
STANISLAUS	0.3%	21.3%	5.0%	1.4%	34.1%	35.6%	1.4%	0.9%	100.0%
OTHERS COMBINED	0.9%	23.7%	4.6%	1.9%	38.2%	27.2%	1.1%	2.5%	100.0%
ALL OUT-OF-REGION COUNTIES	1.0%	25.0%	3.3%	2.3%	35.3%	30.2%	0.8%	2.1%	100.0%

TABLE 5.4

TRIP PURPOSE BY INCOME

TOTAL HOUSEHOLD INCOME FOR 1989

TRIP PURPOSE	LESS THAN $12,500	$12,500-$19,999	$20,000-$29,999	$30,000-$39,999	$40,000-$49,999	$50,000-$74,999	$75,000-$99,999	OVER $100,000	TOTAL
CONVENTION	2.9%	3.8%	7.1%	13.2%	15.2%	20.5%	15.4%	21.9%	100.0%
BUSINESS	1.2%	0.9%	3.3%	8.3%	11.4%	25.3%	20.0%	29.5%	100.0%
MILITARY LEAVE	11.7%	18.9%	20.0%	18.9%	13.9%	8.3%	5.6%	2.8%	100.0%
BUSINESS TRIPS	**1.5%**	**1.6%**	**4.0%**	**8.9%**	**11.7%**	**24.6%**	**19.4%**	**28.4%**	**100.0%**
TRAVEL-SCHOOL	24.0%	7.3%	8.4%	9.8%	9.1%	16.7%	8.0%	16.7%	100.0%
FAMILY EMERGENCY	10.8%	8.1%	11.7%	15.2%	9.2%	19.8%	11.4%	13.8%	100.0%
VACATION	7.1%	4.6%	9.4%	15.2%	14.3%	21.7%	12.3%	15.5%	100.0%
VISIT FRIENDS/FAMILY	9.5%	7.0%	11.5%	14.4%	13.7%	19.7%	11.2%	12.9%	100.0%
OTHER	8.8%	4.3%	10.6%	10.6%	15.2%	21.7%	12.9%	15.8%	100.0%
NON-BUSINESS TRIPS	**8.7%**	**5.7%**	**10.3%**	**14.5%**	**13.8%**	**20.7%**	**11.7%**	**14.5%**	**100.0%**

TABLE 5.5

TRIP PURPOSE BY AGE

AGE OF RESPONDENT

TRIP PURPOSE	19 OR YOUNGER	20 - 29 YEARS	30 -39 YEARS	40 - 49 YEARS	50 - 65 YEARS	OVER 65 YEARS	TOTAL
CONVENTION	2.0%	9.0%	30.1%	29.1%	21.0%	8.8%	100.0%
BUSINESS	0.9%	16.1%	34.8%	29.7%	16.7%	1.8%	100.0%
MILITARY LEAVE	4.0%	57.4%	22.9%	15.0%	0.6%	0.2%	100.0%
BUSINESS TRIPS	1.1%	16.6%	34.1%	29.3%	16.6%	2.3%	100.0%
TRAVEL-SCHOOL	28.8%	46.7%	9.0%	10.5%	4.1%	1.0%	100.0%
FAMILY EMERGENCY	5.0%	16.8%	20.7%	22.2%	21.5%	13.7%	100.0%
VACATION	8.1%	26.2%	24.7%	20.6%	14.0%	6.4%	100.0%
VISIT FRIENDS/FAMILY	13.1%	24.0%	18.7%	16.0%	16.3%	11.9%	100.0%
OTHER	13.4%	25.9%	21.9%	18.0%	13.8%	6.9%	100.0%
NON-BUSINESS TRIPS	10.5%	25.8%	22.0%	18.7%	14.7%	8.3%	100.0%

- PART IV -

- SECTION 6 -

- REASONS FOR CHOOSING -

- AIRPORT -

TABLE 6.1

REASONS GIVEN FOR SELECTING AIRPORT BY FLIGHT DESTINATION

AIR PARTIES WITH CALIFORNIA DESTINATIONS

MAIN REASON FOR CHOOSING AIRPORT	SFO	OAK	SJC
CHOSEN BY OFFICE/TRAVEL AGENT	12.6%	6.4%	6.5%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	29.9%	37.7%	44.7%
CLOSEST AIRPORT TO BUSINESS	12.0%	12.5%	26.7%
BEST FLIGHT TIME	5.0%	2.6%	2.5%
DIRECT FLIGHT TO DESTINATION	14.8%	6.0%	6.8%
LOWER FARES	8.9%	17.8%	3.1%
CHEAPER/MORE CONVENIENT PARKING	1.4%	3.8%	0.8%
LESS CROWDED	0.5%	7.6%	2.6%
ALWAYS USE THIS AIRPORT	10.1%	3.1%	3.5%
OTHER	4.8%	2.5%	2.7%
TOTAL	100.0%	100.0%	100.0%

AIR PARTIES WITH DOMESTIC AND INTERNATIONAL DESTINATIONS

CHOSEN BY OFFICE/TRAVEL AGENT	20.7%	10.7%	8.0%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	18.6%	47.7%	46.0%
CLOSEST AIRPORT TO BUSINESS	8.8%	11.4%	24.0%
BEST FLIGHT TIME	4.2%	3.7%	2.3%
DIRECT FLIGHT TO DESTINATION	29.3%	5.0%	6.7%
LOWER FARES	4.5%	5.9%	2.2%
CHEAPER/MORE CONVENIENT PARKING	0.8%	1.4%	0.7%
LESS CROWDED	0.3%	8.6%	3.6%
ALWAYS USE THIS AIRPORT	8.0%	2.9%	3.5%
OTHER	4.8%	2.7%	2.9%
TOTAL	100.0%	100.0%	100.0%

TABLE 6.2
REASONS GIVEN FOR SELECTING AIRPORT BY AGE

SAN FRANCISCO INTERNATIONAL AIRPORT

MAIN REASON FOR CHOOSING AIRPORT	19 OR YOUNGER	20 - 29 YEARS	30 -39 YEARS	40 -49 YEARS	50 - 65 YEARS	OVER 65 YEARS
CHOSEN BY OFFICE/TRAVEL AGENT	22.8%	22.5%	19.4%	16.6%	15.0%	19.4%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	28.3%	27.5%	23.8%	18.2%	21.2%	25.3%
CLOSEST AIRPORT TO BUSINESS	2.1%	8.1%	15.6%	11.5%	9.3%	3.9%
BEST FLIGHT TIME	4.0%	4.6%	4.3%	5.9%	4.5%	4.6%
DIRECT FLIGHT TO DESTINATION	23.2%	22.2%	25.4%	27.2%	30.3%	25.9%
LOWER FARES	10.0%	8.8%	6.1%	4.7%	4.3%	2.9%
CHEAPER/MORE CONVENIENT PARKING	2.7%	0.8%	1.0%	1.3%	0.6%	-
LESS CROWDED	0.7%	0.3%	0.2%	0.4%	0.5%	-
ALWAYS USE THIS AIRPORT	-	-	-	8.7%	8.7%	10.8%
OTHER	6.2%	5.2%	4.1%	5.4%	5.6%	7.1%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

OAKLAND INTERNATIONAL AIRPORT

MAIN REASON FOR CHOOSING AIRPORT	19 OR YOUNGER	20 - 29 YEARS	30 -39 YEARS	40 -49 YEARS	50 - 65 YEARS	OVER 65 YEARS
CHOSEN BY OFFICE/TRAVEL AGENT	10.9%	10.1%	8.1%	7.2%	6.4%	7.0%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	45.2%	43.0%	39.4%	40.8%	39.6%	55.3%
CLOSEST AIRPORT TO BUSINESS	3.7%	9.5%	14.7%	16.5%	13.8%	3.7%
BEST FLIGHT TIME	3.0%	2.7%	3.6%	3.4%	3.4%	1.0%
DIRECT FLIGHT TO DESTINATION	6.2%	5.0%	4.8%	5.5%	6.4%	6.8%
LOWER FARES	18.3%	16.1%	12.5%	9.1%	11.0%	8.5%
CHEAPER/MORE CONVENIENT PARKING	2.7%	3.0%	3.2%	2.2%	2.9%	2.1%
LESS CROWDED	4.2%	5.8%	8.7%	9.4%	10.6%	8.1%
ALWAYS USE THIS AIRPORT	2.7%	2.6%	2.7%	3.2%	2.9%	4.7%
OTHER	3.0%	2.2%	2.2%	2.8%	3.1%	2.8%
TOTAL	100 0%	100.0%	100.0%	100.0%	100.0%	100.0%

SAN JOSE INTERNATIONAL AIRPORT

MAIN REASON FOR CHOOSING AIRPORT	19 OR YOUNGER	20 - 29 YEARS	30 -39 YEARS	40 -49 YEARS	50 - 65 YEARS	OVER 65 YEARS
CHOSEN BY OFFICE/TRAVEL AGENT	7.8%	8.9%	7.5%	6.6%	7.2%	6.1%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	60.5%	48.7%	41.8%	38.2%	46.8%	58.8%
CLOSEST AIRPORT TO BUSINESS	4.1%	20.9%	33.0%	33.5%	24.1%	5.9%
BEST FLIGHT TIME	3.0%	1.8%	2.0%	3.2%	3.1%	1.6%
DIRECT FLIGHT TO DESTINATION	7.4%	5.8%	5.9%	7.5%	7.3%	9.5%
LOWER FARES	6.3%	3.7%	2.0%	1.4%	2.0%	4.0%
CHEAPER/MORE CONVENIENT PARKING	2.1%	0.6%	0.6%	0.6%	0.8%	0.9%
LESS CROWDED	2.2%	3.2%	2.8%	3.8%	3.1%	3.6%
ALWAYS USE THIS AIRPORT	4.4%	3.4%	2.6%	3.7%	3.7%	5.6%
OTHER	2.4%	3.0%	1.7%	1.4%	2.0%	4.0%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 6.3

REASONS GIVEN FOR SELECTING AIRPORT BY INCOME

SAN FRANCISCO INTERNATIONAL AIRPORT

TOTAL HOUSEHOLD INCOME FOR 1989

MAIN REASON FOR CHOOSING AIRPORT	Less Than $12,500	$12,500-$19,999	$20,000-$29,999	$30,000-$39,999	$40,000-$49,999	$50,000-$74,999	$75,000-$99,999	Over $100,000
CHOSEN BY OFFICE/TRAVEL AGENT	19.7%	21.4%	24.1%	19.3%	21.0%	19.5%	13.8%	13.5%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	27.1%	25.0%	23.3%	24.8%	18.6%	21.7%	21.5%	23.1%
CLOSEST AIRPORT TO BUSINESS	2.1%	3.4%	6.0%	7.6%	8.8%	9.7%	13.7%	20.2%
BEST FLIGHT TIME	3.8%	2.7%	4.2%	5.3%	3.4%	5.4%	6.2%	5.7%
DIRECT FLIGHT TO DESTINATION	22.3%	24.1%	22.8%	24.0%	24.0%	22.6%	26.5%	15.1%
LOWER FARES	6.9%	8.6%	6.0%	6.2%	7.3%	5.6%	5.9%	4.4%
CHEAPER/MORE CONVENIENT PARKING	0.4%	0.5%	0.8%	1.2%	1.8%	0.8%	1.1%	0.8%
LESS CROWDED	0.4%	-	0.3%	0.2%	0.8%	0.3%	0.4%	0.3%
ALWAYS USE THIS AIRPORT	11.2%	11.1%	8.3%	6.5%	8.5%	9.9%	5.9%	11.4%
OTHER	6.2%	3.2%	4.3%	5.0%	5.7%	4.3%	5.1%	5.6%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 6.4

REASONS GIVEN FOR SELECTING AIRPORT BY INCOME

OAKLAND INTERNATIONAL AIRPORT

TOTAL HOUSEHOLD INCOME FOR 1989

MAIN REASON FOR CHOOSING AIRPORT	Less Than $12,500	$12,500- $19,999	$20,000- $29,999	$30,000- $39,999	$40,000- $49,999	$50,000- $74,999	$75,000- $99,999	Over $100,000
CHOSEN BY OFFICE/TRAVEL AGENT	9.7%	11.5%	8.8%	11.1%	9.4%	7.8%	7.0%	4.3%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	50.8%	47.3%	45.8%	45.0%	43.2%	39.2%	38.6%	37.1%
CLOSEST AIRPORT TO BUSINESS	4.5%	5.6%	4.8%	8.8%	11.2%	13.3%	19.6%	18.5%
BEST FLIGHT TIME	3.3%	3.2%	2.2%	3.1%	2.4%	2.6%	3.7%	4.2%
DIRECT FLIGHT TO DESTINATION	6.0%	4.3%	6.0%	5.0%	5.5%	5.6%	5.2%	6.4%
LOWER FARES	12.4%	13.0%	16.1%	12.7%	11.0%	12.5%	10.4%	12.0%
CHEAPER/MORE CONVENIENT PARKING	1.5%	1.3%	3.6%	2.4%	2.1%	3.3%	3.0%	3.3%
LESS CROWDED	4.6%	6.0%	6.6%	7.1%	8.8%	10.1%	7.7%	9.9%
ALWAYS USE THIS AIRPORT	3.4%	3.6%	3.2%	3.0%	3.8%	3.2%	3.3%	1.8%
OTHER	3.7%	4.2%	2.8%	1.7%	2.7%	2.4%	1.5%	2.4%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE 6.5

REASONS GIVEN FOR SELECTING AIRPORT BY INCOME

SAN JOSE INTERNATIONAL AIRPORT

TOTAL HOUSEHOLD INCOME FOR 1989

MAIN REASON FOR CHOOSING AIRPORT	Less Than $12,500	$12,500-$19,999	$20,000-$29,999	$30,000-$39,999	$40,000-$49,999	$50,000-$74,999	$75,000-$99,999	Over $100,000
CHOSEN BY OFFICE/TRAVEL AGENT	6.2%	9.6%	10.8%	8.3%	8.7%	8.3%	6.2%	5.4%
CLOSEST AIRPORT TO RESIDENCE/HOTEL	64.4%	58.5%	55.8%	50.5%	49.7%	41.3%	42.4%	39.1%
CLOSEST AIRPORT TO BUSINESS	4.5%	5.1%	8.7%	17.0%	18.4%	28.2%	33.5%	35.2%
BEST FLIGHT TIME	1.7%	0.9%	1.9%	1.5%	2.5%	2.3%	2.5%	3.0%
DIRECT FLIGHT TO DESTINATION	6.8%	9.2%	8.4%	8.2%	6.3%	6.6%	4.8%	6.0%
LOWER FARES	6.7%	2.0%	3.1%	3.5%	2.9%	2.6%	2.0%	1.9%
CHEAPER/MORE CONVENIENT PARKING	0.4%	2.0%	0.6%	0.8%	1.0%	0.7%	0.6%	0.7%
LESS CROWDED	1.2%	3.7%	3.3%	4.0%	3.4%	3.2%	3.0%	3.4%
ALWAYS USE THIS AIRPORT	4.4%	5.7%	3.9%	4.3%	3.6%	3.9%	2.9%	2.9%
OTHER	3.7%	3.2%	3.5%	2.1%	3.5%	2.8%	2.1%	2.5%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- PART IV -

- SECTION 7 -

- AIRPORT ARRIVAL TIMES -

TABLE 7.1

AVERAGE AIRPORT ARRIVAL TIMES PRIOR TO FLIGHT
BY FLIGHT DESTINATION

	ARRIVAL TIME PRIOR TO FLIGHT IN MINUTES			
DESTINATION	SAN FRANCISCO INTERNATIONAL AIRPORT	OAKLAND INTERNATIONAL AIRPORT	SAN JOSE INTERNATIONAL AIRPORT	**ALL BAY AREA AIRPORTS**
CALIFORNIA	66.5	59.9	59.2	**63.7**
DOMESTIC	86.0	69.0	66.1	**81.6**
INTERNATIONAL	122.3	72.4	103.7	**120.2**
ALL DESTINATIONS	**82.5**	**63.9**	**63.6**	**77.1**

TABLE 7.2

AVERAGE ARRIVAL TIMES PRIOR TO FLIGHT BY GROUND TRANSPORTATION MODE FOR EACH AIRPORT

	ARRIVAL TIMES PRIOR TO FLIGHT IN MINUTES			
GROUND TRANSPORTATION MODE	SFO	OAK	SJC	ALL BAY AREA AIRPORTS
ALL TRANSPORTATION MODES	**82.5**	**63.9**	**63.6**	**77.1**
PRIVATE CAR	75.9	59.7	60.6	**70.1**
RENTAL CAR	90.8	72.5	68.5	**84.4**
AC-SAMTRANS-SC TRANSIT	91.4	61.6	73.6	**87.5**
"AIRPORTER" EXPRESS BUSES	87.7	85.3	77.9	**87.6**
OTHER TRANSIT (Includes AirBART)	93.3	73.8	84.1	**87.8**
ON-CALL VAN SERVICE	81.0	78.3	73.5	**80.7**
TAXI	77.6	73.4	72.9	**76.8**
HOTEL COURTESY VAN	96.8	62.5	71.8	**92.2**
LUXURY LIMOUSINE	77.2	72.2	66.1	**76.5**
CHARTER OR TOUR BUSES	111.7	132.7	77.1	**111.8**
OTHER (Includes MILITARY BUS)	**144.3**	**84.6**	**51.6**	**130.7**

NOTE:
MILITARY BUS was combined into the "OTHER" category due to the small number of respondents that both used this mode and provided arrival time information.

TABLE 7.3

AVERAGE AIRPORT ARRIVAL TIMES PRIOR TO FLIGHT BY GROUND TRANSPORTATION AND TRIP PURPOSE

ARRIVAL TIMES PRIOR TO FLIGHT IN MINUTES

	TRIP PURPOSE	
GROUND TRANSPORTATION MODE	BUSINESS	NON-BUSINESS
ALL TRANSPORTATION MODES	**72.2**	**79.8**
PRIVATE CAR	63.7	72.4
RENTAL CAR	76.2	93.7
AC-SAMTRANS-SC TRANSIT	105.7	81.9
"AIRPORTER" EXPRESS BUSES	82.3	89.6
OTHER TRANSIT	84.3	89.4
ON-CALL VAN SERVICE	79.7	81.3
TAXI	72.3	81.1
HOTEL COURTESY VAN	82.7	98.9
LUXURY LIMOSINE	66.2	85.6
CHARTER OR TOUR BUSES	114.6	110.8
OTHER	105.4	150.0

NOTE:
BUSINESS TRIPS include travel for conventions and conferences and for commercial and military puposes.

- PART IV -

- SECTION 8-

- FREQUENCY OF FLYING -

- TRIP DURATION -

&

- AIR PARTY DEMOGRAPHICS -

TABLE 8.1

FREQUENCY OF FLYING FOR AIR PARTIES
BY COUNTY OF RESIDENCE

AVERAGE NUMBER OF FLIGHTS PER YEAR

COUNTY OF RESIDENCE	ALL BAY AREA AIRPORTS	SFO	OAK	SJC
ALAMEDA	8.4	3.4	3.6	1.4
CONTRA COSTA	11.3	5.5	5.3	0.5
MARIN	11.8	10.7	1.0	0.2
NAPA	5.0	3.5	0.8	0.6
SAN FRANCISCO	10.3	9.4	0.8	0.2
SAN MATEO	9.8	8.7	0.3	0.8
SANTA CLARA	9.6	3.5	0.2	5.9
SOLANO	8.2	5.4	2.4	0.4
SONOMA	6.8	6.3	0.4	0.1
BAY AREA	**9.6**	**6.1**	**1.6**	**1.9**

TABLE 8.2

TRIP DURATION BY RESIDENCE STATUS AND TRIP PURPOSE

TRIP PURPOSE	TRIP DURATION (NUMBER OF NIGHTS)
BAY AREA RESIDENTS	
Convention	4.6
Business	6.2
Military Leave	19.4
AVERAGE BUSINESS TRIP DURATION	**6.3**
School	49.7
Family Emergency	8.3
Vacation	9.8
Visit Friends/Family	8.2
Other	10.0
AVERAGE NON-BUSINESS TRIP DURATION	**10.1**
AVERAGE TRIP DURATION FOR ALL TRIP PURPOSES	**8.9**
NON-RESIDIENTS	
Convention	5.7
Business	4.7
Military Leave	16.9
AVERAGE BUSINESS TRIP DURATION	**5.1**
School	21.7
Family Emergency	9.6
Vacation	7.9
Visit Friends/Family	10.1
Other	11.9
AVERAGE NON-BUSINESS TRIP DURATION	**9.1**
AVERAGE TRIP DURATION FOR ALL TRIP PURPOSES	**7.6**

NOTE FOR TABLE 8.2:

The values for Average Number of Days Away from the Bay Area (for residents) and Average Number of Days in the Bay Area (for non-residents) were calculated using only those respondents with trip durations of less than 365 days. Respondents with trip durations greater than 365 days were removed from the sample since stays of one year or greater often result in changes in residence status. This table, therefore, is not directly comparable with similar tables in prior reports.

TABLE 8.3

INCOME BY COUNTY OF RESIDENCE

TOTAL HOUSEHOLD INCOME FOR 1989

COUNTY OF RESIDENCE	Less Than $12,500	$12,500-$19,999	$20,000-$29,999	$30,000-$39,999	$40,000-$49,999	$50,000-$74,999	$75,000-$99,999	Over $100,000	TOTAL
ALAMEDA	8.1%	4.6%	8.9%	11.8%	13.1%	24.9%	14.2%	14.3%	100.0%
CONTRA COSTA	3.4%	2.7%	5.1%	10.7%	15.2%	24.6%	14.1%	24.1%	100.0%
MARIN	4.3%	1.4%	6.7%	9.8%	11.2%	14.9%	21.0%	30.8%	100.0%
NAPA	6.5%	0.7%	3.9%	13.4%	14.8%	21.8%	17.4%	21.4%	100.0%
SAN FRANCISCO	6.9%	4.7%	12.1%	16.0%	12.4%	21.7%	11.5%	14.7%	100.0%
SAN MATEO	4.6%	3.1%	7.6%	12.8%	11.7%	23.5%	16.3%	20.4%	100.0%
SANTA CLARA	4.1%	3.1%	5.5%	10.9%	13.9%	22.3%	18.3%	21.9%	100.0%
SOLANO	1.1%	6.6%	5.9%	11.0%	18.1%	28.0%	12.3%	17.1%	100.0%
SONOMA	11.8%	5.1%	10.4%	13.2%	8.5%	24.1%	10.4%	16.5%	100.0%
BAY AREA RESIDENTS	**5.6%**	**3.7%**	**7.9%**	**12.4%**	**13.1%**	**22.9%**	**15.2%**	**19.3%**	**100.0%**
OUT OF BAY AREA	**5.2%**	**3.9%**	**6.3%**	**12.5%**	**12.5%**	**22.0%**	**14.6%**	**22.9%**	**100.0%**
OUT OF STATE	**6.1%**	**4.6%**	**8.8%**	**13.7%**	**12.6%**	**21.7%**	**13.4%**	**19.1%**	**100.0%**

TABLE 8.4

RESIDENCE STATUS OF AIR PARTIES
BY AIRPORT

	SAN FRANCISCO INTERNATIONAL AIRPORT	OAKLAND INTERNATIONAL AIRPORT	SAN JOSE INTERNATIONAL AIRPORT	ALL BAY AREA AIRPORTS
BAY AREA RESIDENTS	38.1%	51.0%	48.0%	41.3%
NON-RESIDENTS	61.9%	49.0%	52.0%	58.7%
TOTAL	100.0%	100.0%	100.0%	100.0%

TABLE 8.5

AIR PARTY SIZE, LUGGAGE AND ACCOMPANIERS BY AIRPORT

AIRPORT	Average Air Party Size	Average Number of Bags per Party	Average Number of People Who Came to See Party Off
SFO	1.84	3.18	0.57
OAK	1.64	2.70	0.66
SJC	1.52	2.49	0.70

- PART IV -

- SECTION 9 -

- FLIGHT DESTINATIONS -

TABLE 9.1

FLIGHT DESTINATIONS BY COUNTY OF ORIGIN

FLIGHT DESTINATIONS

COUNTY OF ORIGIN	CALIFORNIA	DOMESTIC	INTERNATIONAL	TOTAL
ALAMEDA	36.6%	59.4%	3.9%	100.0%
CONTRA COSTA	34.3%	61.4%	4.3%	100.0%
MARIN	33.5%	62.2%	4.3%	100.0%
NAPA	36.1%	60.2%	3.7%	100.0%
SAN FRANCISCO	38.9%	55.8%	5.3%	100.0%
SAN MATEO	32.7%	61.6%	5.7%	100.0%
SANTA CLARA	36.5%	60.0%	3.6%	100.0%
SOLANO	26.0%	70.8%	3.2%	100.0%
SONOMA	34.6%	60.0%	5.4%	100.0%
BAY AREA	**36.0%**	**59.4%**	**4.6%**	**100.0%**
OUTSIDE REGION	**35.4%**	**55.1%**	**9.5%**	**100.0%**

TABLE 9.2

FINAL AIRPORT DESTINATIONS
FOR INTRA-CALIFORNIA AIR TRAVELERS

DESTINATION CITY	AIRPORT	PERCENT
LOS ANGELES	LAX	44.1%
SAN DIEGO	SAN	17.1%
BURBANK	BUR	12.4%
SANTA ANA	SNA	10.2%
ONTARIO	ONT	8.2%
LONG BEACH	LGB	4.8%
SANTA BARBARA	SBA	0.8%
PALM SPRINGS	PSP	0.7%
FRESNO	FAT	0.4%
OXNARD	OXR	0.2%
MONTEREY	MRY	0.2%
REDDING	RDD	0.1%
SAN FRANCISCO	SFO	0.1%
SAN JOSE	SJC	0.1%
LAKE TAHOE	TVL	0.1%
EUREKA/ARCATA	ACV	0.1%
MODESTO	MOD	0.1%
OAKLAND	OAK	0.1%
SACRAMENTO	SMF	*
SANTA ROSA	STS	*
TOTAL		100.0%

* Less than 0.1 percent

- PART V -

- APPENDICES -

APPENDIX 1: DEFINITIONS

AIR PARTY

The unit for each interview is an *Air Party* . An air party consists of one or more air passengers traveling together. For most of the tables in this report, the unit of analysis is the air party. In some cases, the data has been adjusted by air party size to compare differences in the distributions of air parties and air passengers.

AIRPORTER EXPRESS BUS

Any privately-owned scheduled transit service that provides direct, express service to Bay Area Airports

CONNECTING PASSENGERS AND THROUGH PASSENGERS

Connecting passengers are those who use Bay Area airports to transfer between planes but do not enter or exit the airport via ground transportation. Through passengers are those that are booked on the same aircraft into and out of one of the Bay Area airports. Through passengers often exit and re-board their plane. Connecting passengers and through passengers were excluded from the survey sample.

COUNTY OF ORIGIN

The county from which an air party actually left for the airport. This might be different from the county in which a respondent lives or is visiting.

GROUND TRANSPORTATION MODE

The type of transportation an air party used to get to the airport.

ON-CALL VAN SERVICE

Privately-owned demand responsive paratransit services (i.e. Supershuttle).

RESIDENT

A resident is defined as a person living in the nine-county San Francisco Bay Area. Non-residents include visitors to the Bay Area and residents of counties outside the Bay Area who use Bay Area Airports.

SAN FRANCISCO BAY AREA (aka BAY AREA or REGION)

The nine contiguous urbanized counties recognized by the Bureau of the Census. The region includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano and Sonoma Counties.

APPENDIX 2: SURVEY INSTRUMENT

MTC AIR PASSENGER SURVEY QUESTIONNAIRE

NO_____DATE _ _ HOUR _ _ _ _ AIRLINE _ _ FLT _ _ _ _ M _ F _

1. **Did you arrive at this airport today by airplane?** YES - TERMINATE / NO - Continue

2. **What is your FINAL airport destination today?** _____ _ _ _

3. **What is/was the MAIN purpose of your trip?**
   - 1___ Convention or conference
   - 2___ Business trip
   - 3___ Travel to/from school
   - 4___ Personal family emergency
   - 5___ Vacation
   - 6___ Visit friends/relatives
   - 7___ Military leave/travel
   - 8___ Other _____

   Code: _____

4. **How many people in your air party INCLUDING YOURSELF are taking this flight?** ____

5. **How many people have come to see you off who will NOT take this flight?** ___

6. **How long before your flight is scheduled to depart did you arrive at the airport?** ____ min.

7. **How many TOTAL pieces of luggage do you and your party have?** _____

8. **How many nights will you be AWAY from the Bay Area or have you BEEN in the Bay Area on this trip?** ____ N/A ____

9. **What form of transportation DID YOU JUST USE to arrive at this airport today?**

   A. AUTO - A1- Rental Car ___ Which company? _____ **Skip to QUESTION 10**

   - A2 - Private _____ COMPLETE THE FOLLOWING
     - Upon arriving at the airport, did you go directly to the parking lot or were you dropped off at the curb?
       1____ Dropped off at curb 2____ Parking lot first
     - Will the car you arrived in be parked at the airport for the duration of the trip or driven away by others? 1____ Parked for Duration 2___ Driven Away by others
     - If the car you arrived in is parked at the airport, even for a short period, where is it parked?

     SFO - Main Garage (ST) 1____ Long Term Lot 2____ Off - Airport Lot 3____
     SJC - Short Term Lot 1____ Long Term Lot 2____ Off - Airport Lot 3____
     OAK - Long Term Lot 1___ Economy Lot 2___ Short Term Lot 3___ Off-Airport Lot • Park and Fly 4___ • Airpark 5___ • EZ Access Park 6___ • Other 7___

   B. SCHEDULED TRANSIT - (SHOW CARD #1) _____

   C. ON-CALL TRANSIT - (SHOW CARD #1) _____

   D. OTHER - (SHOW CARD #1) _____

   HOW DID YOU GET TO THE SCHEDULED/ON-CALL/OTHER TRANSIT?
   1___ BART 2___ Taxi 3___ Bus 4___ Walk 5___ Cal Train
   6___ Auto (self) 7___ Auto (dropped off) 8___ N/A

10. **In what city and state do you live?** CITY _____ STATE _____ CODE _____

11. **From what address did you just leave for the airport?**
    Street address, block, or nearest intersection A _____
    City B _____
    Zip Code (if possible) C _____

12. **Was this location**
    - 1___ your home or residence
    - 2___ your place of work
    - 3___ a hotel/motel
    - 4___ the home of a friend or relative
    - 5___ a business you were visiting
    - 6___ other

    Code: _____

13. **In the last 12 months, how many times have you flown from:**

San Francisco Airport	San Jose Airport	Oakland Airport
A_____	B_____	C_____

14. **Which of the following explains your MAIN REASON for choosing this airport for this trip?** (Show Card #2) Code: _____

15. **How many people live in your household, INCLUDING YOURSELF?** _____

16. **Which of these categories BEST approximates your yearly HOUSEHOLD income before taxes?** (Show Card #3) _____

17. **Which of the following age ranges applies to you?** (Show Card #4) _____

Interviewer I.D. _____

APPENDIX 3: INTERVIEWER PROMPT CARDS

CARD #1

SCHEDULED TRANSIT
1___ AC Transit, SamTrans, Santa Clara Transit
2___ Sonoma County Airporter
3___ SFO Airporter
4___ Marin Airporter
5___ Evans Airporter
6___ Santa Rosa Airporter
7___ Oakland Airport Express
8___ Oakland Air BART
9___ Travis Express
10___ Airport Connection
11___ SC Airport Express
12___ Other

ON CALL TRANSIT
13___ Taxi
14___ On Call Van Service (pd)
• Bayporter, Super Shuttle, etc
15___ Luxury Limousine
16___ Helicopter

OTHER
17___ Hotel Courtesy Car (free)
18___ Charter or Tour Bus
19___ Military Bus
20___ Other

CARD #2

MAIN REASON for choosing this Airport:
1___Chosen by TRAVEL AGENT or OFFICE
2___ Closest to BUSINESS
3___ Closest to RESIDENCE/HOTEL
4___ Always use this airport
5___ Direct flight to destination
7___Cost/availability of parking
8 ___Less crowded
9___ Lower fares
10___Best flight time
88___ Other

CARD #3

INCOME
1___ Less than $12,500
2___ $12,500 - $19,999
3___ $20,000 - $29,999
4___ $30,000 - $39,999
5___ $40,000 - $49,999
6___ $50,000 - $74,999
7___ $75,000 - $99,999
8___ $100,000 - $149,999
9___ More than $150,000

AGE
1___ 12 or younger
2___ 13 - 19
3___ 20 - 29
4___ 30 - 39
5___ 40 - 49
6___ 50 - 65
7___ Over 65

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ATTACHMENT B
MTC REGIONAL AIRPORT SYSTEM PLAN

SELECTED REGIONAL FORECASTS
TRA Airport Consulting
May 1991

DRAFT INVENTORY AND ALTERNATIVES DEFINITION
(Includes: Chapter IV, "Inventory and Capability Assessment"
Chapter VII, "Airport System Alternatives Definition")
TRA Airport Consulting
Draft Report - May 1991

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D
REF
387.736
Sa524mpb
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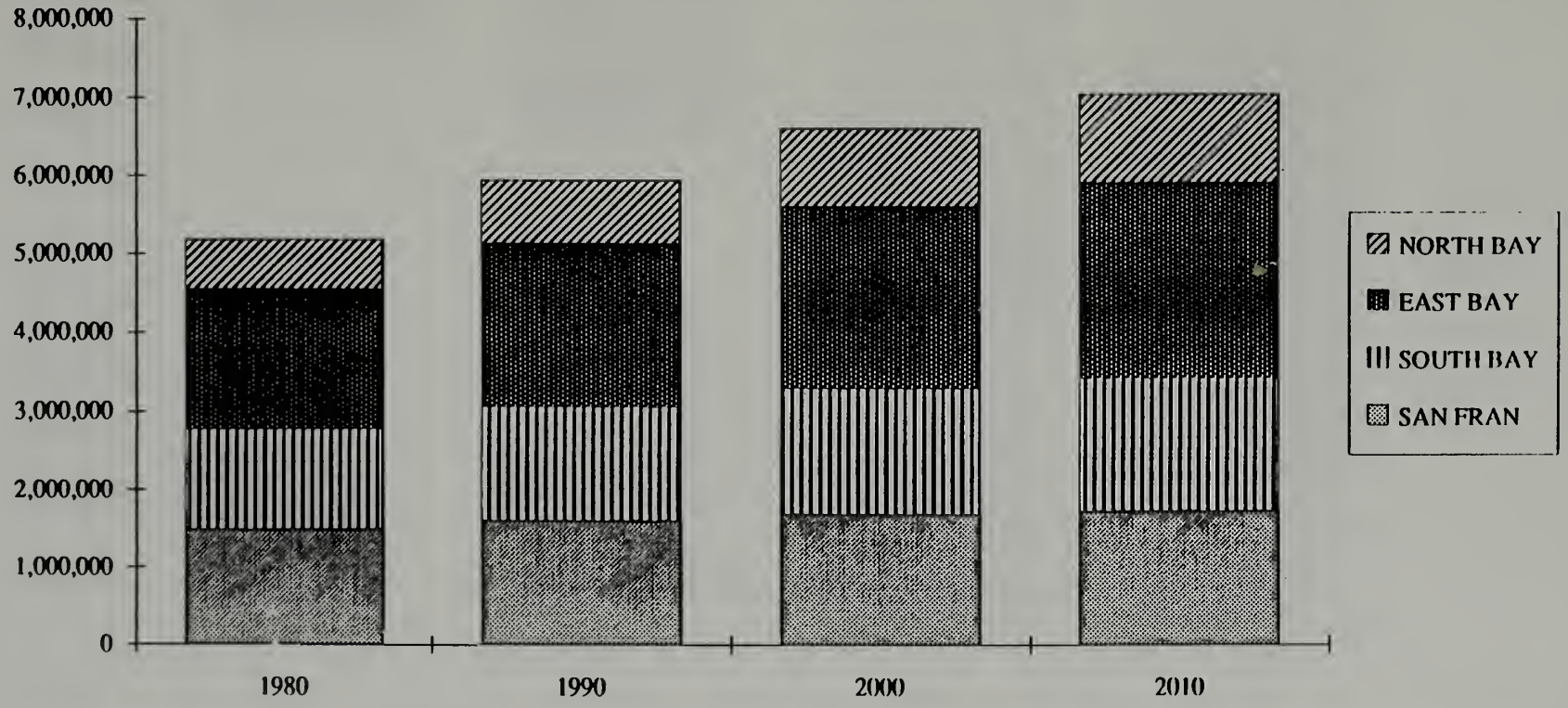
MTC

Regional Airport System Plan Update

REGIONAL POPULATION FORECASTS



NOTES: Forecasts are from Association of Bay Area Governments, Projections 1990.

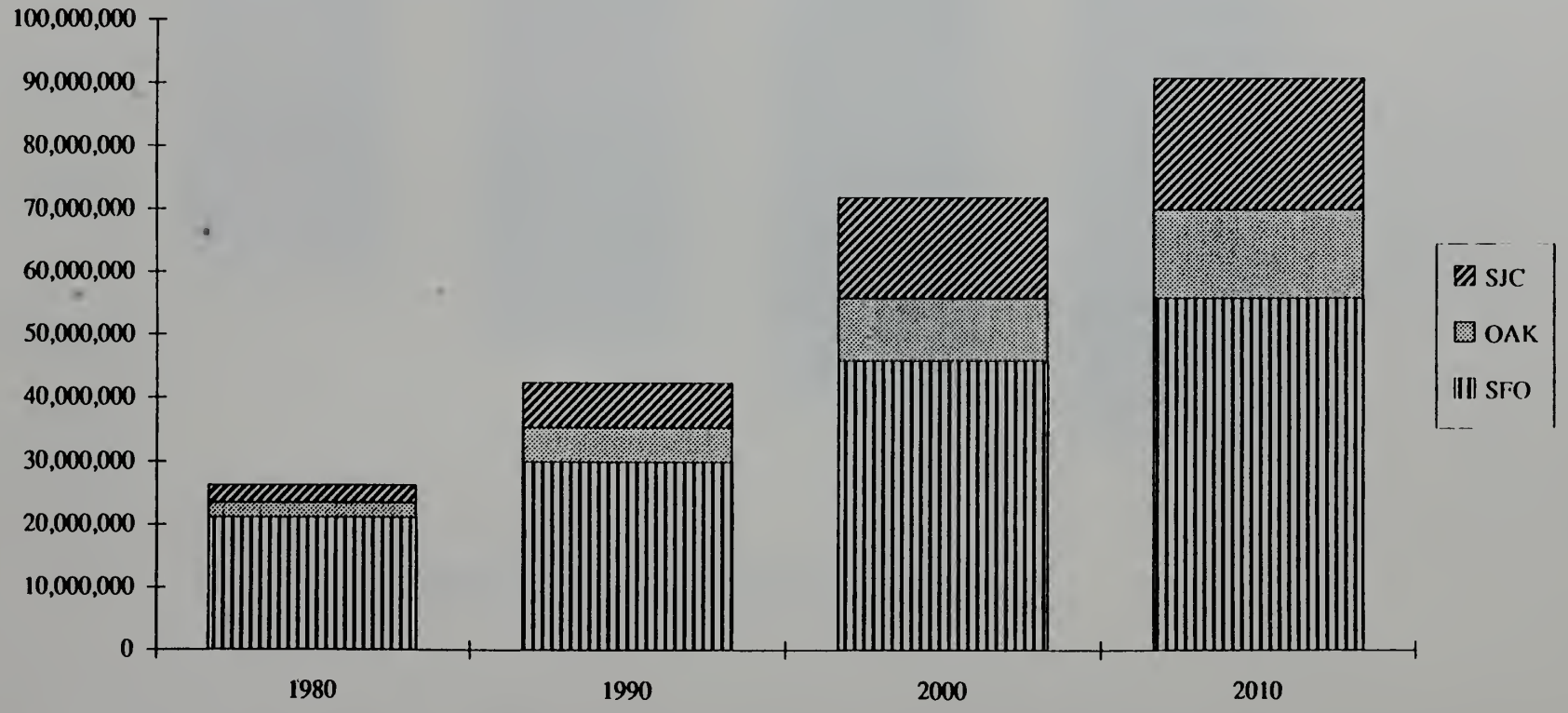
SOURCE: TRA Airport Consulting, Draft MTC Regional Airport System Plan, May 1991.

NORTH BAY	Napa, Solano and Sonoma Counties
EAST BAY	Alameda and Contra Costa Counties
SOUTH BAY	Santa Clara County
SAN FRANCISCO	Includes Marin County

MTC

Regional Airport System Plan Update

REGIONAL PASSENGER FORECASTS

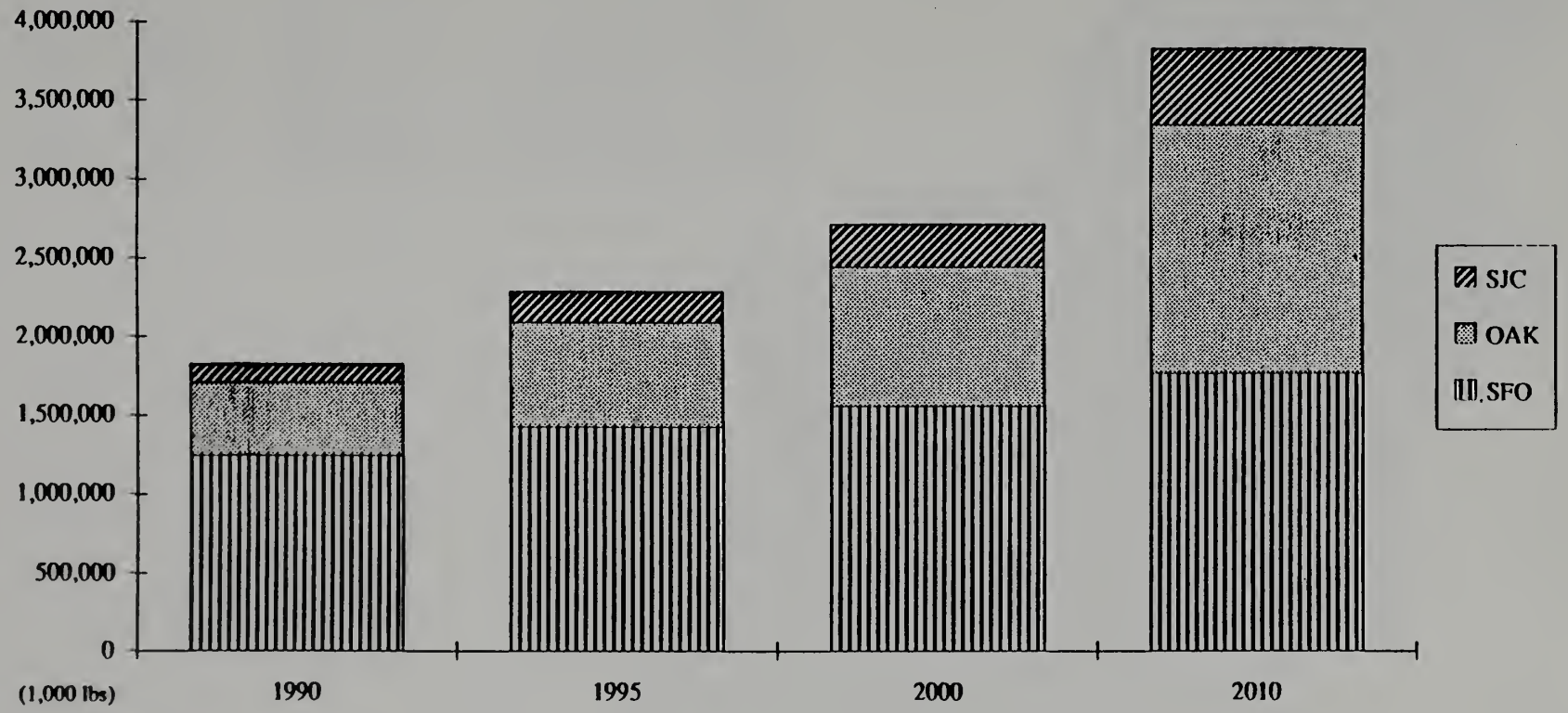


SOURCE: TRA Airport Consulting, Draft MTC Regional Airport System Plan, May 1991.

MTC

Regional Airport System Plan Update

REGIONAL AIR CARGO FORECASTS



SOURCE: TRA Airport Consulting, Draft MTC Regional Airport System Plan, May 1991.

[San Francisco International Airport 1991]

D REF 387.736 Sa524mpb
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AGENDA ITEM #3a

MTC

Regional Airport System Plan

DRAFT

Inventory and
Alternatives Definition

Prepared by
TRA Airport Consulting

May 1991

CHAPTER IV

INVENTORY and CAPABILITY ASSESSMENT

INTRODUCTION

This chapter documents the existing physical, operational, environmental, and policy conditions for each airport in the system, and for the system as a whole. In addition, the chapter presents information on the constraints and capabilities of the airports, and the airport system. These constraints and capabilities directly affect the system's ability to meet current and future aviation demand in the region.

Physical conditions data includes such items as airport ownership, location, and size; number and length of runways; airport classification; number and type of based aircraft; amount of passenger terminal facilities; and presence of an air traffic control tower. Operational conditions data includes items such as total annual and peak hour operations; air carrier, commuter, and general aviation operations; annual passenger enplanements; and annual air cargo volume. Environmental conditions include information about the natural and human environment near each airport, noise sensitive land uses, wildlife habitat, and wetlands. Policy conditions information includes current airport master plan, capital improvement program, and other policy opportunities and constraints which affect the development and operation of individual airports and the airport system as a whole.

Finally, the chapter presents information about the technical constraints and capabilities which affect the airport system. These include landside (vehicle access and parking, terminal, and related facilities) and airside (aircraft parking, taxiways, and runways) capacity and regional airspace.

The inventory includes all public use and military airports in the region. Private airfields are included in less detail because less information is available about private use facilities. This inventory also contains information about public use airports which have been closed completely and military airfields which are inactive (closed to military operations but still able to be used), such as Hamilton Field. Although currently closed, these facilities are important aviation resources which should be considered in planning for the regional aviation system.

This chapter catalogues current data (in most cases 1990) on the physical facilities and operations at the airports under consideration. Historic data on operations, passengers, air cargo, and based aircraft for the period 1980 through 1990 is included in Chapter V (Historical Airport Data). This data will be drawn upon for trend documentation and in preparation of the aviation system forecasts (see Chapter VI).

The system will first be characterized, with reference made to the 1980 MTC System Plan to identify major changes in the past decade. A look at the facilities and operations for the year 1990, including a capacity analysis, is then presented to be the basis for alternatives development and analysis.

Much of the information used in this inventory was derived from The California Aviation System Plan (Element 1: Inventory published August 1990), by the California Department of Transportation Division of Aeronautics. Other data sources included the most recent individual airport master plans and capital improvement programs, current and historic FAA Airport Master Records (FAA 5010 forms), FAA activity statistics, and the individual airports. The most current information available has been used. In most cases this represents conditions in the year 1990.

A survey of the airport operators provided planning documents as well as information about site specific conditions which could impact future capacity. A follow up survey gave the airports an opportunity to be involved in the MTC planning process.

THE REGIONAL AIRPORT SYSTEM

The regional airport system includes some 25 public use civil airports, 4 military airports, and 17 private use facilities. All of the airports in the system are listed below.

Of the 25 public use airports there are 5 with commercial airline service while the other 20 are general aviation airports. These are mapped in Exhibit 4.1. "Commercial service" airports are defined by the National Plan of Integrated Airport Systems (NPIAS) as those which have scheduled airline service and enplane more than 2,500 passengers annually. General Aviation airports by definition do not have scheduled service, and only serve general aviation aircraft.

The commercial service airports in the region process not only people but also air cargo. The largest three are the only ones to have an appreciable number of all cargo operations. These airports are noted in Exhibit 4.4. The 16 private use, private ownership general aviation airports are displayed in Exhibit 4.6.

There are 12 public use airports which currently have helicopter activities and/or services, shown in Exhibit 4.3 along with the region's heliports which are listed below. These include all 5 of the commercial service airports and 7 general aviation airports denoted below by an "H". Facilities serving primarily as gliderports are designated with a "G" and are illustrated in Exhibit 4.5. FAA Air Traffic Control towered airports are indicated by a star and are mapped in Exhibit 4.2. Please see also Exhibit 4.23 for the complete airport system data inventory.

❑ Commercial Service Airports:

San Francisco International ☆ **H**
Metropolitan Oakland International ☆ **H**
San Jose International ☆ **H**
Buchanan Field (Concord) ☆ **H**
Sonoma County ☆ **H**

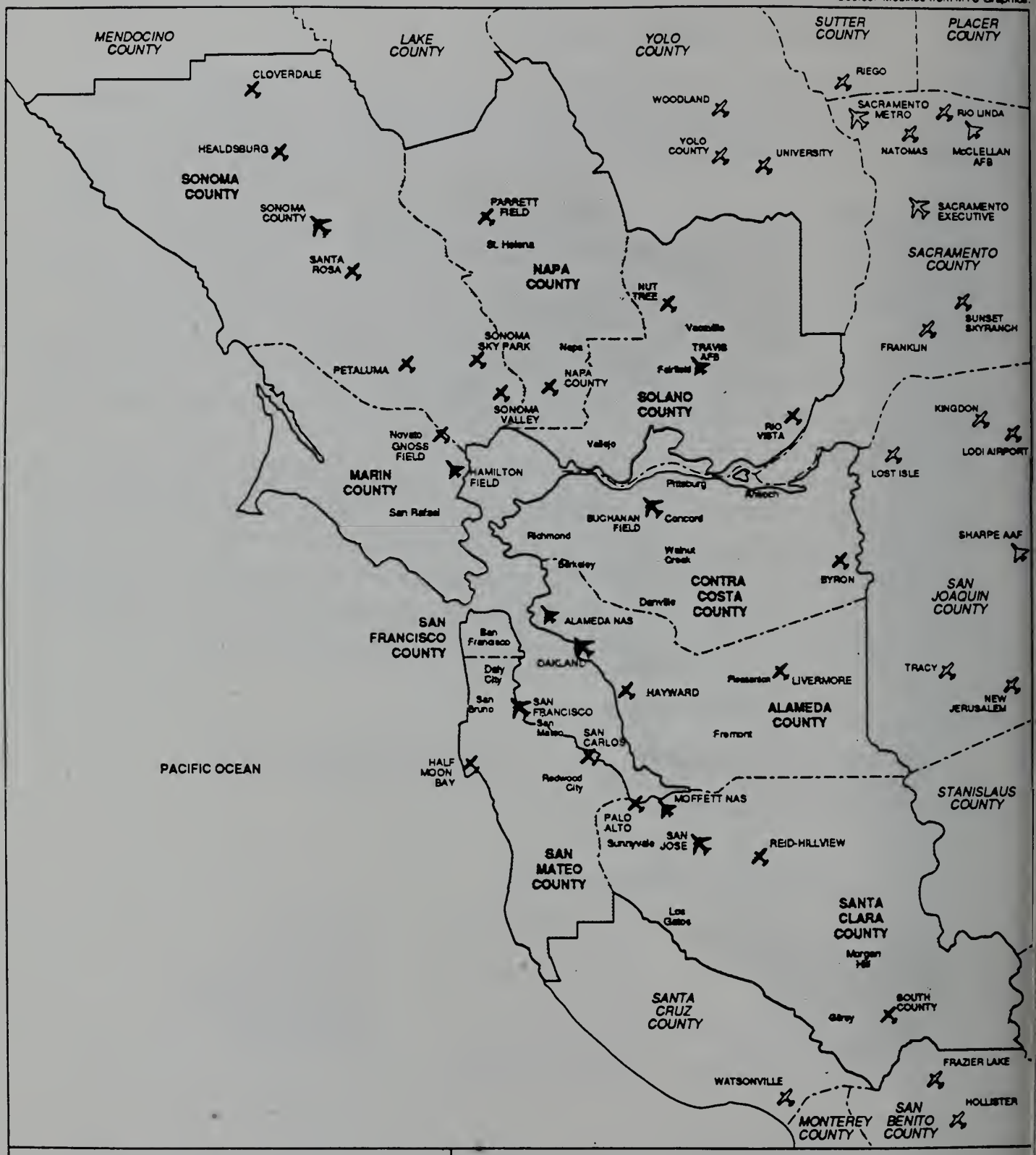
❑ General Aviation Airports (public use):

Byron
Cloverdale Municipal
Gnoss Field **H**
Half Moon Bay **H**
Hayward Air Terminal ☆ **H**
Healdsburg Municipal
Livermore Municipal ☆ **H**
Napa County ☆ **H**
Nut Tree
Oakland (North Field) ☆
Palo Alto ☆
Parrett Field
Petaluma Municipal
Reid-Hillview ☆ **H**
Rio Vista
San Carlos ☆
Santa Rosa Air Center
Sonoma Sky Park
Sonoma Valley
South County

❑ Military Airports:

Alameda NAS ☆ **H**
Hamilton Field
Moffett Field (NAS) ☆ **H**
Travis AFB ☆

Source: Modified from MTC Graphics.



LEGEND

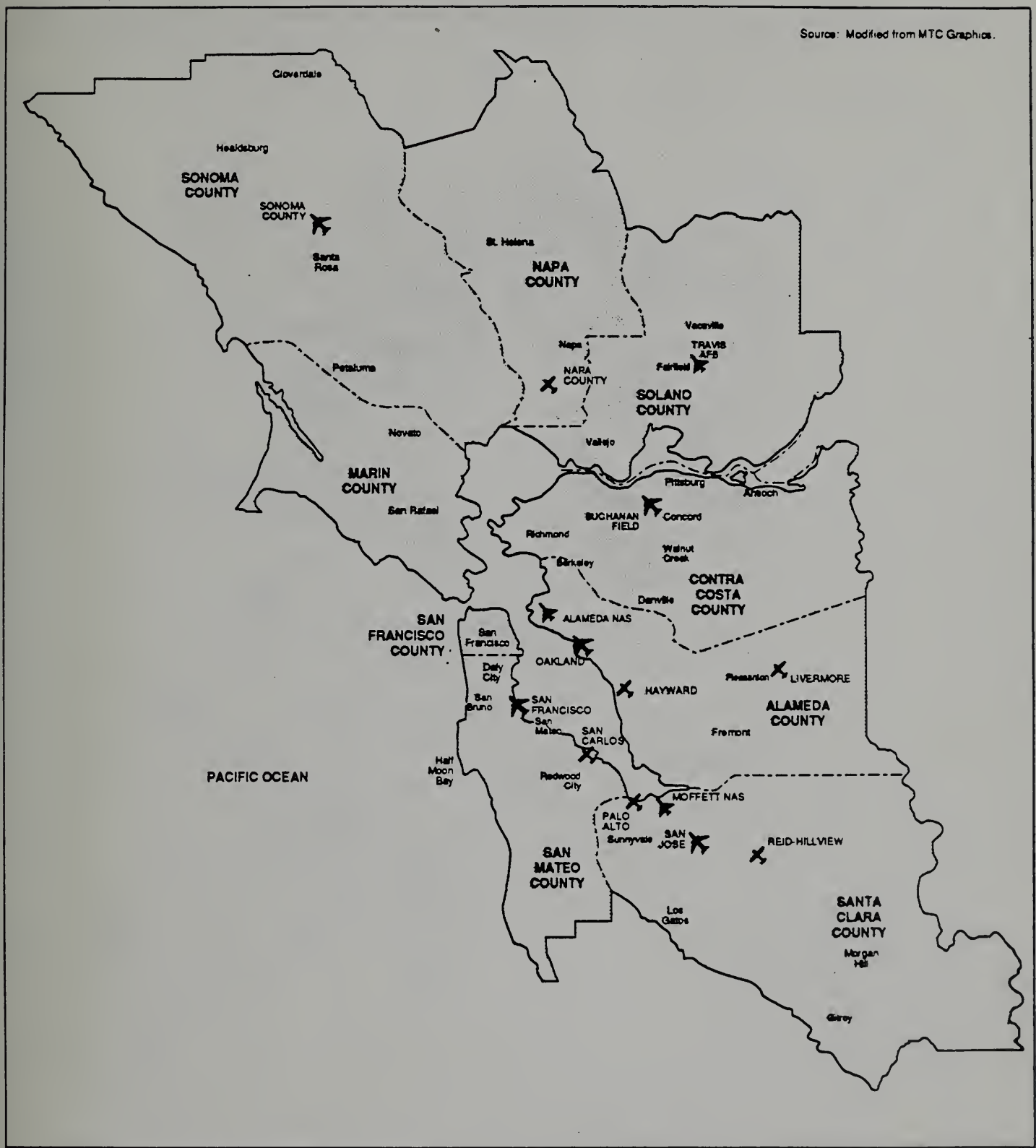
Airports Inside Study Region	Airports Outside Study Region
Air Carrier	Air Carrier
General Aviation	General Aviation
Military	Military

MTC

Regional Airport System Plan

Exhibit 4.1

THE AIRPORT SYSTEM
PUBLIC USE FACILITIES



LEGEND

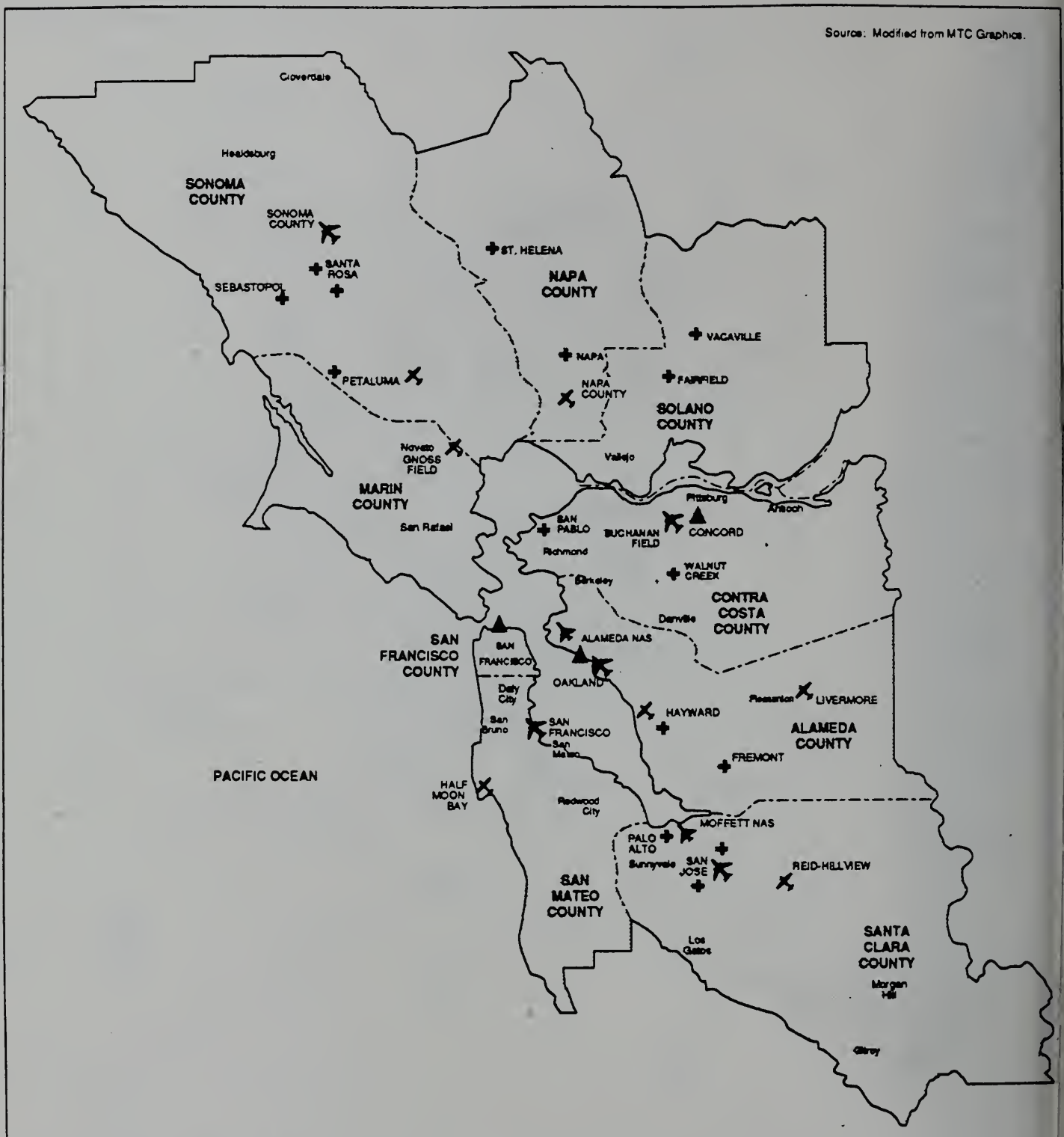
- Air Carrier
- General Aviation
- Military

MTC

Regional Airport System Plan

Exhibit 4.2

TOWERED AIRPORTS



LEGEND

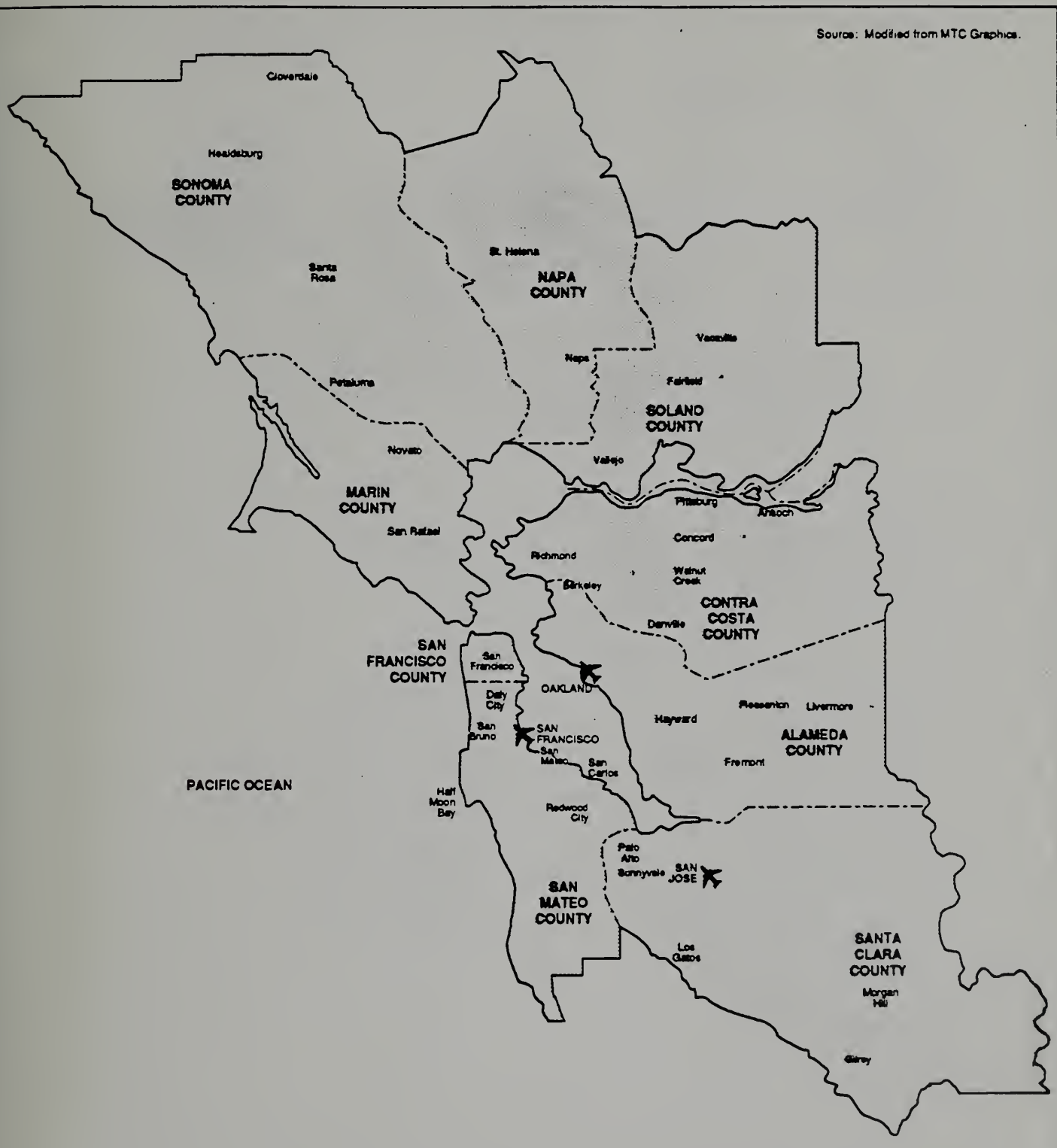
Airports with Helipads	Facilities with Helipads
Air Carrier	Hospitals
General Aviation	Military Centers
Military	Other

MTC

Regional Airport System Plan

Exhibit 4.3

HELICOPTER FACILITIES



LEGEND

Air Carrier

MTC

Regional Airport System Plan

Exhibit 4.4

AIR CARGO AIRPORTS

❑ Private Use Airports

Antioch
Blake
Calistoga Airpark (Closed) G
Commodore Center Seaplane Base
Delta
Fremont (Closed)
Garibaldi
Graywood
Inglenook Ranch
Maine Prairie
Marin
Meadowlark
Moskowite
Mysterious Valley
Pope Valley
Sea Ranch
Sky Soaring G
Travis AFB Aero Club
Vaca-Dixon (Closed)
Vacaville Gliderport G

❑ Public Use Heliports

Port of San Francisco Heliport (Closed)

❑ Military Heliports

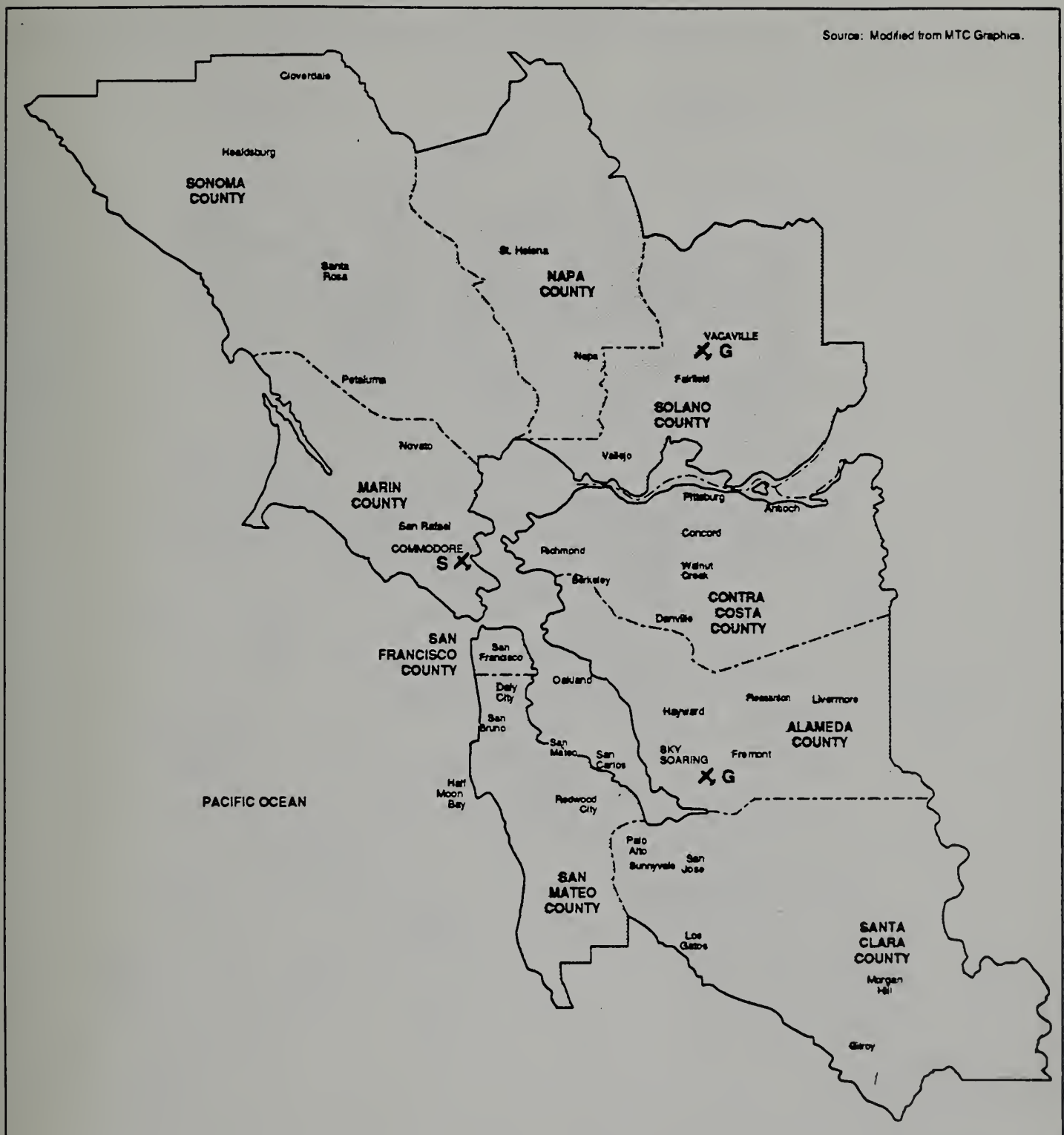
Crissy Army Airfield
Naval Hospital Oakland
Naval Weapons Station Concord

❑ Medical Heliports

Brookside Hospital
Community Hospital
John Muir Memorial Hospital
North Bay Medical Center
Palm Drive Hospital
Petaluma Valley Hospital
Queen of the Valley Hospital
Saint Helena Hospital Site II
Saint Rose Hospital
San Jose Medical Center
Santa Rosa Memorial Hospital
Stanford University Hospital
Vaca Valley Hospital
Valley Medical Center
Washington Hospital

❑ Other Heliports

These airports are part of a complex regional transportation network. The regional highway system and the public transportation system are each mapped to show their relation to the air transportation system. Exhibit 4.7 shows the regional highways, and Exhibit 4.8 shows regional rail transportation.



LEGEND

Private Use Facilities

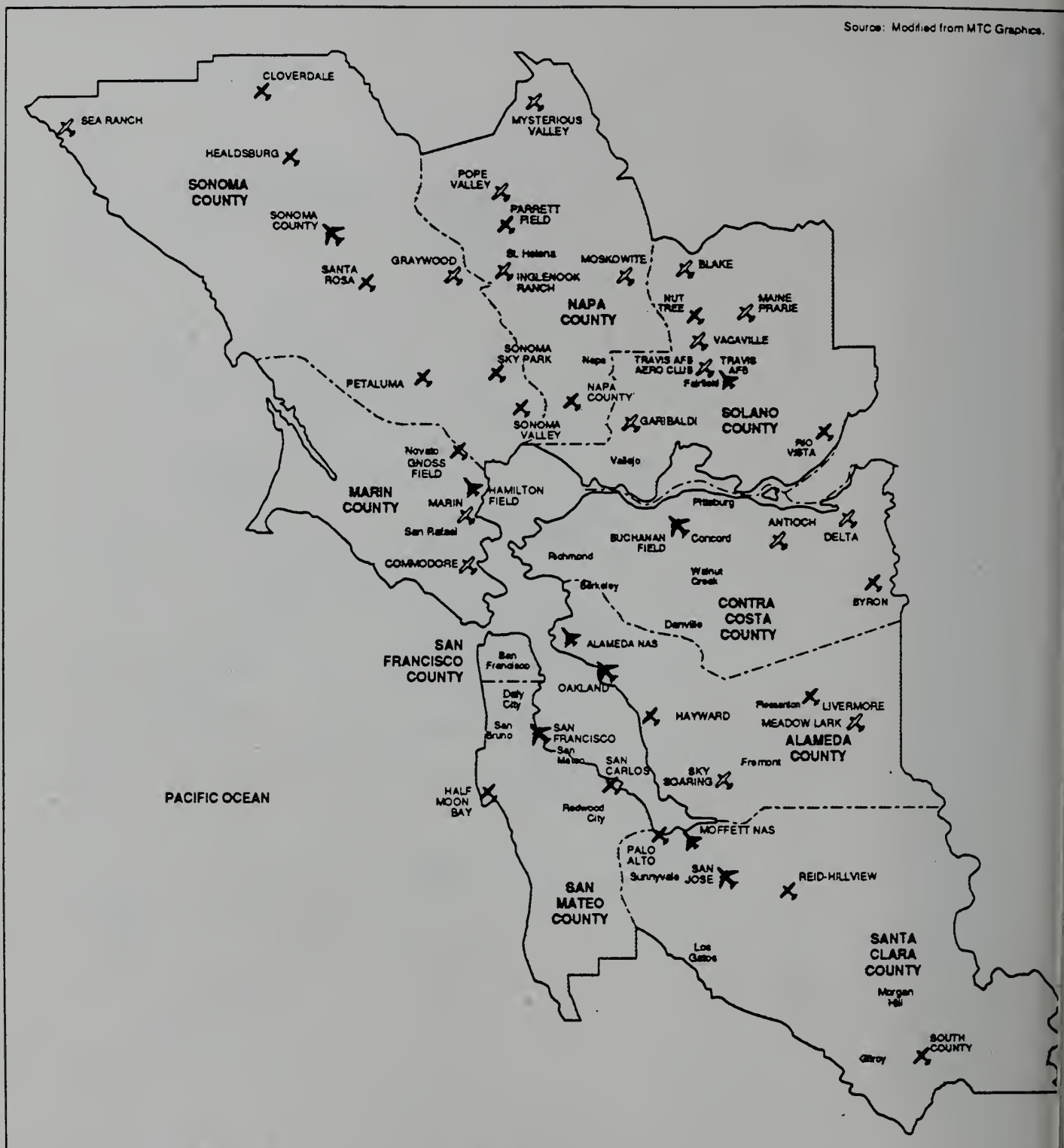
✗	General Aviation
G	Gliderports
S	Seaplane Bases

MTC

Regional Airport System Plan

Exhibit 4.5

SPECIAL USE AIRPORTS



LEGEND

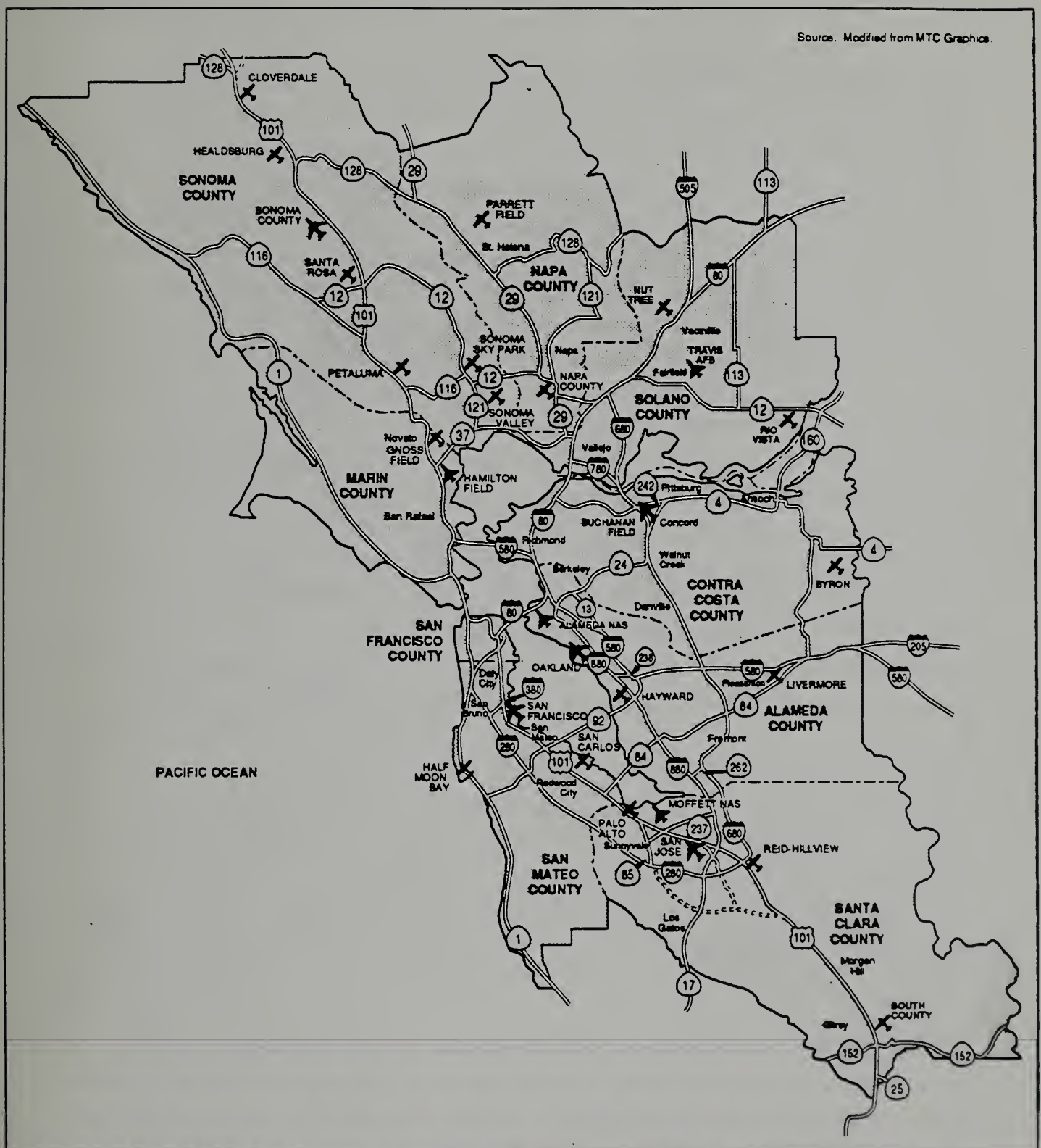
- Air Carrier
- General Aviation
- Military
- GA Private Use

MTC

Regional Airport System Plan

Exhibit 4.6

THE AIRPORT SYSTEM
PUBLIC AND PRIVATE
USE FACILITIES



LEGEND

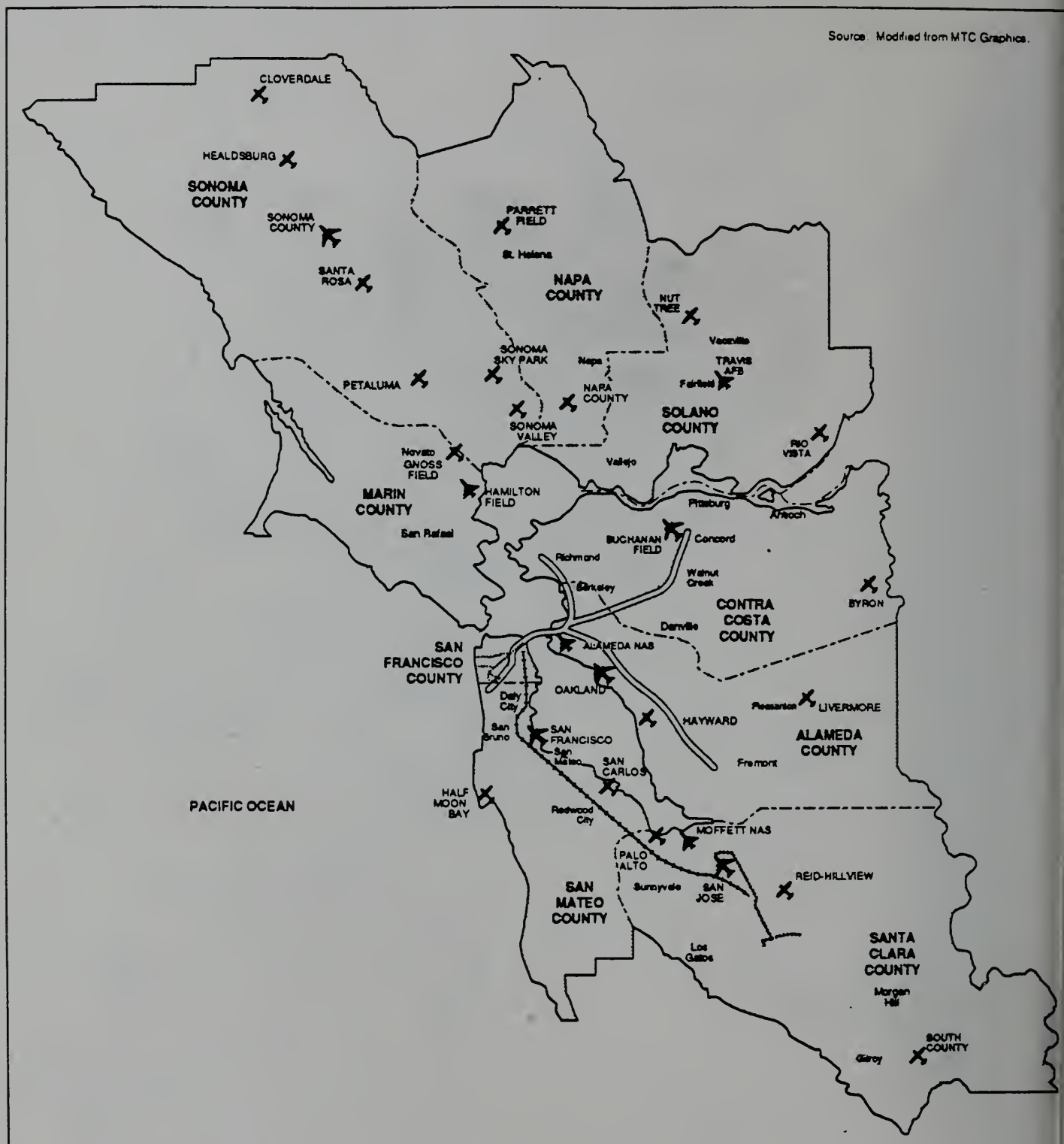
- Highway - Existing
- Highway - Planned/Under construction
- Air Carrier
- General Aviation
- Military

MTC

Regional Airport System Plan

Exhibit 4.7

REGIONAL HIGHWAYS



LEGEND

- Bay Area Rapid Transit (BART)
- CalTrain
- San Francisco Municipal Railway (Muni Metro)
- Santa Clara Light Rail Transit (SCLRT)
- Air Carrier
- General Aviation
- Military

MTC

Regional Airport System Plan

Exhibit 4.8

RAIL TRANSIT

The 4 military airfields in the region are publicly owned but restrict access. They are part of the airport system and are also mapped in Exhibit 4.1. The uncertainty of their status as active military facilities holds them poised for possible joint use conversion or perhaps complete demilitarization. Travis AFB already has a joint use agreement with Solano County which provides for commercial airline service. Private use airports and facilities currently closed are acknowledged because there may be the option for public use and/or acquisition. An example of such an acquisition can be seen in Clark County, Nevada, where the County acquired a closed private use airport which now serves as a reliever for McCarren International Airport in Las Vegas. Byron Airpark in Contra Costa County, another example, was in 1980 a private airstrip, and today is a growing public use general aviation airport.

Helicopter facilities are projected to be an increasingly important component of the national air transportation system in the future. There are two categories: (1) heliports, which are areas with full helicopter servicing available, and (2) helistops, which are pads strictly for takeoffs and landings. The only publicly owned heliport in the region developed for public use, the Port of San Francisco heliport, located on the waterfront at Piers 30-32, is closed to use. Five of the public use airports have designated helicopter takeoff-landing areas. Also, a number of private heliports and helistops dot the region. These facilities are owned and used by various groups including hospitals, corporations, and the media. In addition, there are several publicly owned military rotorcraft facilities which also limit access by the general public. Helicopter facilities in the region are shown in Exhibit 4.3.

The active gliderports in the system are privately owned, private use airports. There are two: Sky Soaring (formerly Sky Sailing), near Fremont, California, and Vacaville Gliderport near Vacaville, California. Calistoga Airpark in Northern Napa County has recently closed.

The one seaplane base in the region, Commodore Center in Marin County, changed from public use to private at the end of March, 1991. It is currently used for training and sightseeing. A second seaplane facility located adjoining San Francisco International Airport is planned. Special use facilities, those for gliders and for seaplanes, are pointed out in Exhibit 4.5.

Many changes have occurred since the last MTC Regional Airport Plan revision. The number of facilities has increased. Some have shifted in type of ownership and category of use. The 1980 plan recognized 3 commercial airports, 17 public use general aviation airports, and 20 private general aviation airfields (discounting small air strips). The same four military facilities remain today. There were 5 publicly owned heliports: Emeryville Municipal (Alameda), Alameda County Parking Garage (Alameda), Richmond Police Helistop (Contra Costa), and U of C Richmond Field Station (Contra Costa). Eleven private heliports and 5 medical heliports also served the region.

Since 1980 two additional commercial service airports now provide scheduled passenger service: Sonoma County and Buchanan Field. A net gain of two public use general aviation airports and a decrease from 20 to a current 17 private use airstrips shows the static nature of the general aviation market in this decade. In that same time period there has been a reduction in the number of public helicopter landing areas, while the region has seen a tremendous increase in the number of medical heliports from 5 to 15.

AIRPORT FACILITIES

This section is devoted to discussion of the physical facilities at each airport, and is divided into the following groups: commercial service airports; general aviation airports; military airports; and private use general aviation airports. Exhibit 4.23 provides a summary of facility information including: airport classification, number of runways, length of the longest runway, identification of instrument approach, presence of an Air Traffic Control Tower, presence of rotorcraft facilities, and the airport size, in acres.

Ground accessibility is discussed for the airports and illustrated in Exhibit 4.7, the regional highway system, and Exhibit 4.8, the public transportation system.

Commercial Service Airports

SAN FRANCISCO INTERNATIONAL AIRPORT

San Francisco International is the dominant airport in the region, serving over 70% of the total regional passengers in 1990. It began in 1926 as a modest 160 acre site located well outside the city, and has grown to claim a total site of some 5,270 acres. The site, located on the west shore of San Francisco Bay, consists of both upland and submerged saltwater bayland. The airfield system occupies approximately 1,700 acres, land partially consisting of reclaimed tidelands. Undeveloped areas are several and include: the Bayshore Parcel, 180 acres sited near the freeway; the San Bruno Interchange Parcel, 18 acres west of the United Airlines maintenance hanger; the North Field Parcel, a 150 acre parcel on the north field, north of Flying Tigers and JAL airfreight operations; and the east Field Parcel, a crash/fire/rescue practice area accessible by taxiway C.

San Francisco International Airport has two sets of intersecting parallel runways: 28R-10L, 11,870 feet; 28L-10R, 10,600 feet; 1R-19L, 8,901 feet (with a 600 foot displaced threshold); and

Exhibit 4.9

San Francisco International Airport

1L-19R, 7,001 feet. Each is 200 feet wide. They are surfaced with asphalt concrete. Three of the four runways are equipped with Instrument Landing Systems (ILS). An air traffic control tower is situated in the center of the main terminal building.

The airport has by far the largest passenger terminal complex in the region. There are 2.6 million sq. ft. of space serving 80 passenger terminal gates configured as 6 piers. The North terminal contains 2 boarding piers, and the South terminal has 4, including the International terminal.

The buildings surround a five level central public parking garage which has 6,765 stalls. Of these 6,088 are dedicated for short term parking, 223 for valet parking, 128 for taxi staging, and 328 for permit parking. An uncovered lot accessible by shuttle bus has 3,250 long term parking spaces.

Air Freight facilities utilize about 90 acres at San Francisco International, and provide for 34 aircraft parking spots. General Aviation Fixed Based Operators (FBO's), businesses providing general aviation services at an airport, can accommodate 40 based aircraft, and there are 6 private GA parking places. The passenger terminal can accommodate some 70-80 commercial jet aircraft, and there are 9 remote aircraft hardstands, which are aircraft parking places on the apron.

Surface access for San Francisco International is provided by public transit, airporter, limousine, hotel shuttle, and rental car in addition to the private automobile. Rail transportation is not a very convenient access mode at this time. The nearest Bay Area Rapid Transit (BART) station is Daly City, 8 miles away linked to the airport only by a public bus line. The CalTrain runs parallel to the U.S. 101 corridor and comes close to the airport but does not provide direct connection for passengers and employees.

Numerous support facilities including aviation support such as flight kitchens, maintenance hangars, and warehouses, and airport support including crash/fire/rescue, fuel farms, water treatment plants, and a Hilton hotel also occupy space at San Francisco International Airport.

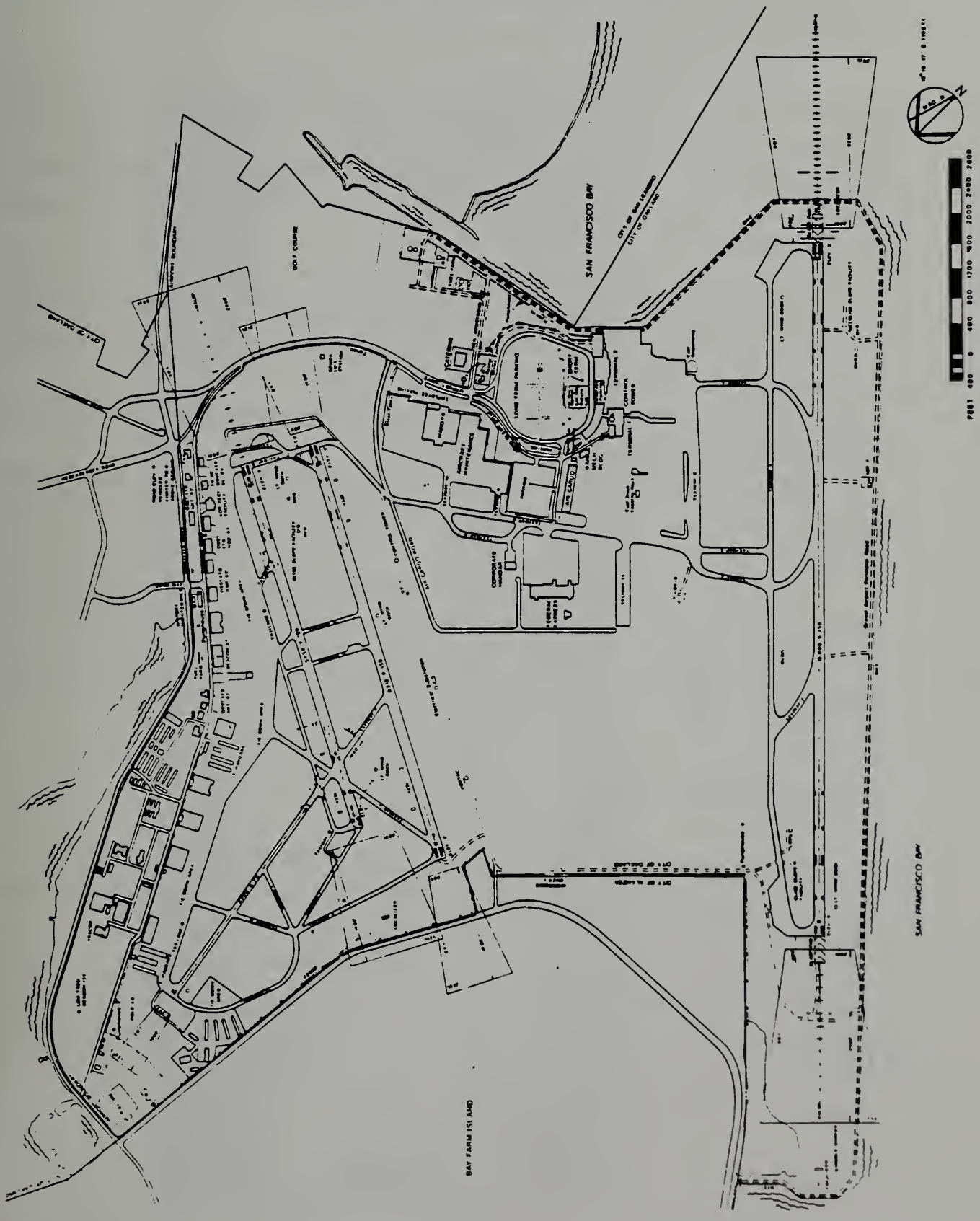
METROPOLITAN OAKLAND INTERNATIONAL

With its humble beginnings as a dirt strip in 1927, the Metropolitan Oakland International Airport has evolved into a 4 runway commercial service airport occupying some 2,600 acres of upland and wetland adjoining the east side of San Francisco Bay. The airport has experienced rapid growth in the past few years, and in 1990 served 13% of the region's passengers. Oakland airport is laid out almost as two separate airports, with commercial service occurring at South Field and general aviation activities occupying North Field.

South field consists of a single transport category runway, runway 11-29, 10,000 feet in length and 150 feet with a parallel taxiway. North field has three runways: 9R-27L, which is

Exhibit 4.10

Metropolitan Oakland International Airport



6,212 feet long and 150 feet wide; 9L-27R, which is 5,452 feet long and 150 feet wide; and 15-33, a short crosswind runway which is 3,366 feet long and 75 feet wide. The air carrier runway, 11-29 at South Field is approximately 6,400 feet from the closest general aviation runway, runway 9-27. There is one designated helicopter takeoff/landing area.

Oakland's passenger terminal complex has two unit terminals containing 20 second-level aircraft gates. The terminal also includes one international arrival gate and a recently expanded international arrivals building large enough to accommodate a 747 and can process 500 peak hour arriving passengers. Surface vehicle parking at the passenger terminal can accommodate some 6,300 vehicles. Public spaces are limited to 4,490: 805 in the short term lot, 3,485 in long term parking, all open air.

Having become the region's hub for overnight small package cargo, Oakland has a large area (some 64 acres) devoted to air cargo activity, including the Federal Express Metroplex facility and an apron area used for belly cargo, both located west of the terminal building. Another 100 acres of air cargo development is forecast for the next 16 years.

Oakland's north field is one the region's largest and busiest general aviation facilities, with a capacity of 641 based aircraft, and occupying 980 acres.

Oakland has two air traffic control towers. One, serving South Field, is located within passenger terminal 1. The second, which serves North Field, is located adjoining the cross-airport dike.

The airport may be reached by private auto and rental car. Alternative means of access include public transit with AC Transit and Air-BART service, and private operators including Greyhound, taxi, limousine, and courtesy van services. The BART Coliseum Station, 3 miles from the airport, is linked by frequently scheduled Air-Bart vehicles to both terminals at the South Airport.

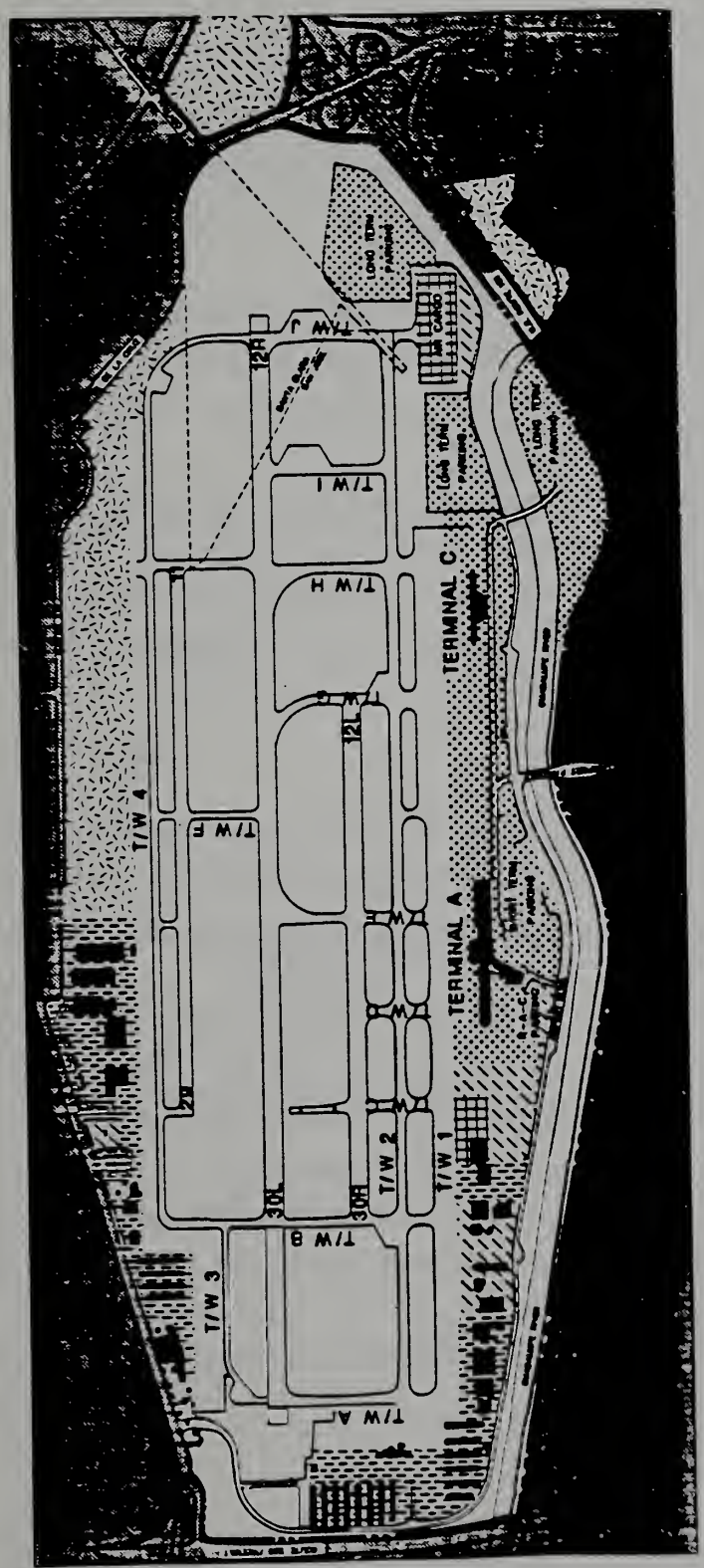
SAN JOSE INTERNATIONAL

San Jose International Airport occupies some 1,050 acres adjoining U.S. 101 on the north, Route 880 to the south, Guadalupe Parkway on the east, and the city of Santa Clara on the west. About 45 acres of airport property are now undeveloped.

There are three parallel runways, one used for air carrier aircraft, one used for commuter and general aviation aircraft, and one used primarily by general aviation. The general aviation runway, 11-29, is 4,600 feet long and 100 feet wide. The air carrier center runway is designated 12R-30L, and is 8,900 feet long and 150 feet wide. The commuter/general aviation runway, designated 12L-30R, is 4,419 feet long and 150 feet wide.

Exhibit 4.11

San Jose International Airport



San Jose now has two unit terminals (A and C) with a total of 32 gates. Of these, all 15 at Terminal A are second level loading bridges, while 16 of the 17 at terminal C are ground level gates.

A combination of surface and structure parking provide 8,250 total parking spaces at the passenger terminal. There is an 1,100 space short term lot in front of terminal C, and a 2,000 space short term parking garage adjacent to terminal A. Three long term surface parking lots provide 4,600 parking spots.

San Jose is also a busy general aviation airport, with 680 existing based aircraft. The general aviation facility also includes the San Jose Jet Center, the San Jose State University aviation program, and several other FBO and support activities, including the base of the Hewlett Packard Company's 7-aircraft fleet.

San Jose has a limited amount of space available for air cargo. Approximately 7 acres of dedicated air cargo apron is located at the northeast corner of the airport. On the southeast side of the airport there is aircraft parking space and an Air Freight Building used jointly by the commercial airlines for processing belly-cargo .

Ground access to San Jose International is possible by private or rented automobile, airport van service, shuttle, taxi, limousine, and bus. The Santa Clara Light Rail Transit (SCLRT) is about one and a half miles from the airport but is not directly connected in any way to the terminal. The CalTrain allows access to the city of San Jose but is quite a distance from the airport as well.

BUCHANAN FIELD (Concord)

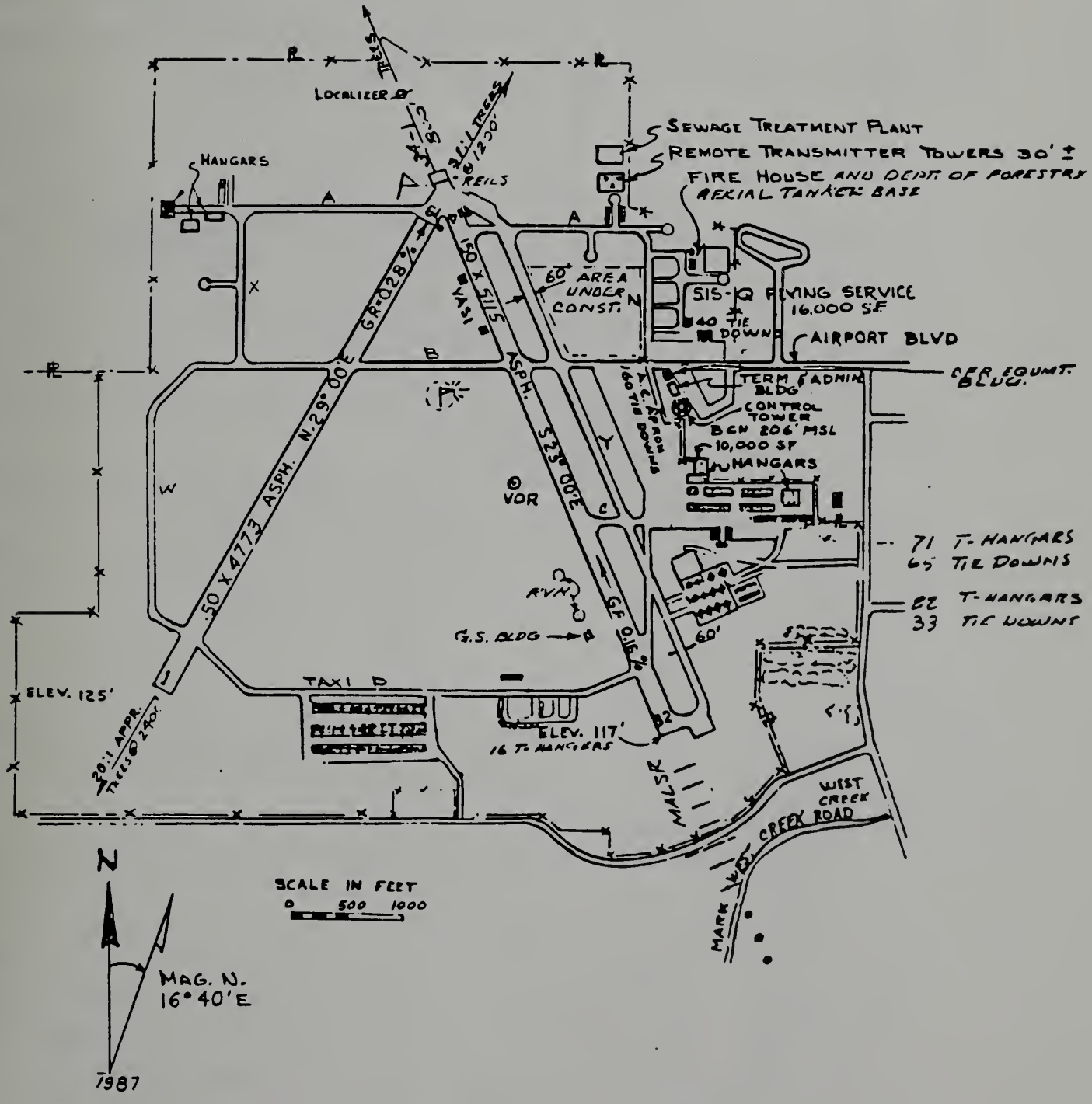
Ground was broken in 1942 for an airport to serve Contra Costa County. Before construction could be completed, though, the Federal Government built two runways there to serve the war effort. Today, Buchanan Field has two pairs of parallel runways on a 530 acre site located near Concord, California.

Runway 19R-1L is the primary runway, 4,400 feet in length and 150 feet in width. The other major runway, 14L-32R is 3,951 feet long and 150 feet wide. Each has a 600 foot minimum safety area. Runway 1R-19L is 2,768 feet in length and 75 feet in width and runway 14R-32L is 2,800 feet long and 75 feet wide. The runway surfaces are asphalt concrete.

The primary runway and that lying parallel to it are equipped with medium intensity runway lights (MIRL), and 19R-1L has runway end identifier lights (REIL) as well. The other runways are not lighted. Non-precision landings are guided onto runway 19R-1L by a visual approach slope indicator (VASI). A terminal building provides processing facilities for the based airlines,

Exhibit 4.12

Sonoma County Airport



and there is an air traffic control tower. Adjacent to the terminal there is a 60,000 square foot open auto parking area.

In addition, there are three designated helicopter take off/landing areas at Buchanan Field, identified on the taxiways. Two are located on the east side of the airport, and one is placed on the west side.

The airport is accessible by Interstate 680 and State Route 4. There is public transit service to Buchanan Field as well as taxi service and rental cars available. One line of BART extends to Concord, about a mile away, but does not provide direct access to the airport.

SONOMA COUNTY

Sonoma County Airport has served Santa Rosa, California and nearby community since 1939, with interim service for the U.S. Army during WWII. It currently occupies 940 acres.

Two crossed asphalt concrete runways support general aviation and air carrier activity. Runway 14-32 is the primary runway, 5,115 feet long, 150 feet wide, and ILS equipped. Runway 1-19, 5,002 feet long and 150 feet wide, has no lighting system but accommodates non-precision landings with Very-High-Frequency Omnirange equipment (VOR). There are two designated helicopter takeoff/landing areas on site.

The airport has an air traffic control tower, and a small terminal for commuter and air carrier traffic. A limited number of auto parking places are available nearby.

Sonoma County is directly accessible by auto on U.S. Highway 101. Ground transportation services available include public transit, taxi, and rental car.

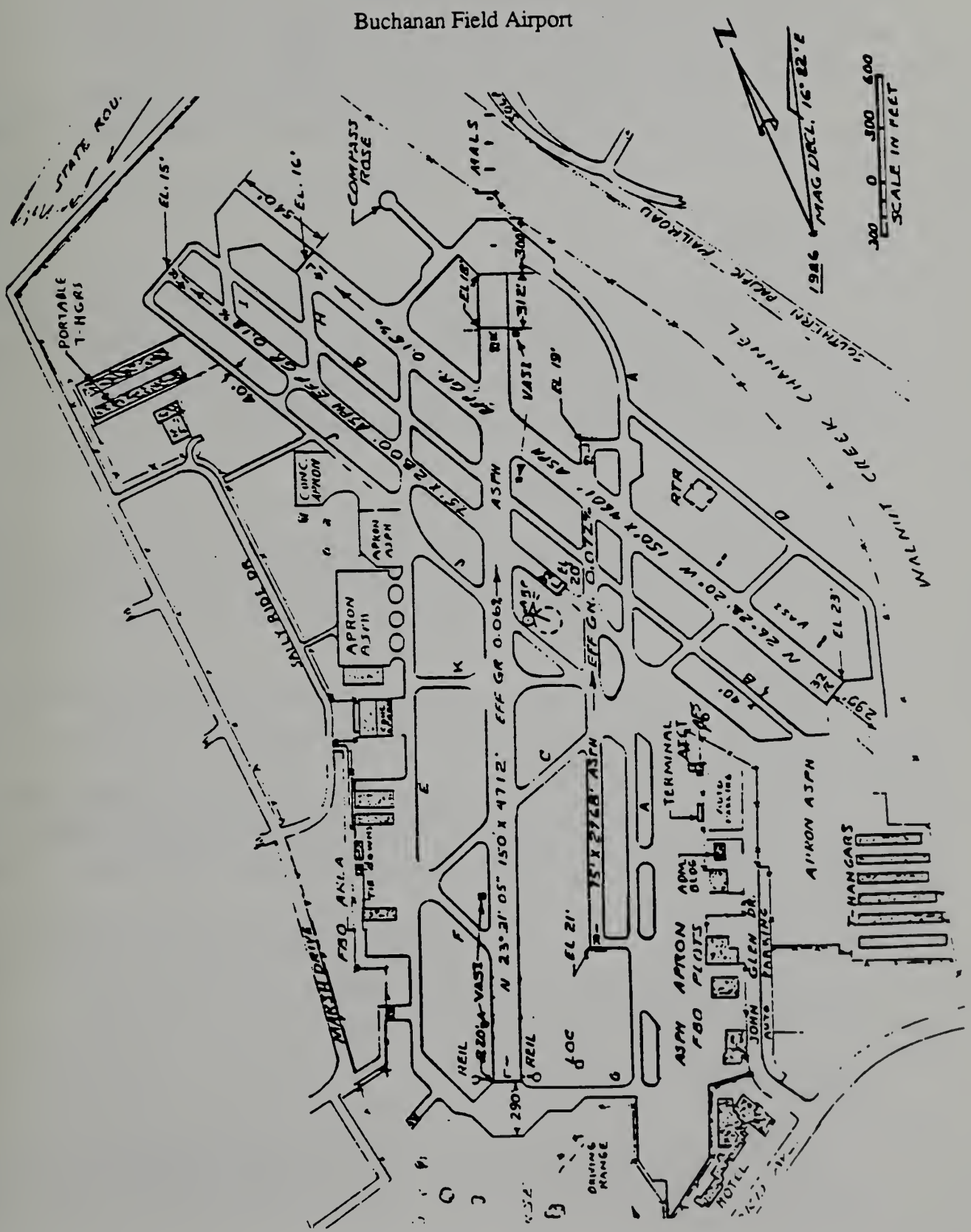
General Aviation Airports

The airports in this group by definition do not host scheduled air carrier or commuter service, and also do not have air cargo activity. Most of the facilities accommodate private or corporate aircraft and limited air taxi service.

The general aviation airports are generally much smaller than the commercial use airports. A few GA airports, such as Hayward (543 acres), Napa County (735 acres), Livermore (510), and Santa Rosa Air Center (500), compare in acreage with Buchanan Field (578 acres), but most of the others are between 50 and 250 acres. Refer to Exhibit 4.23 for the size of each airport. General aviation runway lengths generally range between 2,000 and 3,500 feet, which is typical for the size and design aircraft attracted to use these airstrips. Three airfields have significantly longer runways: Half Moon Bay (5,000 feet), Hayward (5,024), and Napa County (5,931). These airports could accommodate smaller commercial passenger jets such as the Boeing 727 and 737,

Exhibit 4.13

Buchanan Field Airport



and MD-80 series aircraft. Santa Rosa Air Park has a 7,000 foot runway, a length which can accommodate larger air carrier aircraft such as the Boeing 757. Exhibit 4.23 details the length of the longest runway at each facility. Precision instrument approaches are possible at very few general aviation airports, and the majority have no air traffic control tower.

Ground access to the region's general aviation airports is primarily by private automobile. Exhibit 4.7, that depicting the regional highways system, shows the alignment of these facilities along major highway corridors such as U.S. Highway 101.

Military Airports

Four military installations maintain airfield facilities in the region. These are the Naval Air Station at Alameda, located near Oakland in Alameda County; Hamilton Field in Novato, Marin County; Moffett Naval Air Station between Mountain View and Sunnyvale in Santa Clara County; and Travis Air Force Base, southwest of Sacramento in Solano County.

NAVAL AIR STATION (NAS) ALAMEDA

Naval Air Station Alameda provides support services to Naval aviation activities. Berthing space at two piers accommodates aircraft carriers, and ship maintenance is also accomplished at Alameda. The Naval Air Rework Facility Alameda allows for repair and revamping of Navy jet and turboprop aircraft.

The NAS at Alameda is contains 2,479 acres of property owned by the U.S. Navy: 1,521 acres upland, and 958 acres of submerged tideland in San Francisco Bay. In addition, 155 acres are leased from the City of Alameda.

The airfield has two crossed ILS equipped runways: one 8,000 feet in length, 200 feet in width; the other 7,200 feet long, 200 feet wide. Two helicopter landing areas are provided. The airfield at Alameda NAS includes 469,700 square yards of aircraft parking apron and 7 aircraft maintenance hangers. There is an air traffic control tower on site.

NAS Alameda is located in a well developed areas and is easily accessible by ground transportation. Interstate 880 provides an easy approach, and AC Transit bridges the 3 mile distance from the BART City Center station.

HAMILTON FIELD

Hamilton Field, formerly Hamilton Air Force Base, is owned and operated by the United States Army. The airfield is no longer actively used by the Army, but currently accommodates

some activity by the U.S. Coast Guard Strike Team. This unit is on call for emergencies and uses the airfield as required. They do not base any aircraft here. The U.S. military currently uses housing at the field for personnel from all branches and from the U.S. Coast Guard.

A single, 8,000 foot runway is located on the site, with no air traffic control tower.

Roadway access to the base is facilitated by nearby State Highway 101 and local bus service to the main gate by the Golden Gate Transit Company.

NAVAL AIR STATION MOFFETT FIELD

Naval Air Station Moffett Field is an airfield used primarily by P-3 Navy Antisubmarine aircraft to facilitate their patrol of Pacific Coast waters, but also serves the Ames Research Laboratory at the National Aeronautics and Space Administration (NASA).

The 2,263 acre site has two parallel runways separated by 625 feet and fully instrumented. One is 9,200 feet long and 200 feet wide; the other is 8,124 feet long (7,517 feet with displaced threshold) and 200 feet wide. There are 4 aircraft maintenance hangars and 472,300 square yards of aircraft parking apron.

There is an air traffic control tower in operation at Moffett Field.

The facility can be reached easily by State Highway 101, and is linked to an intricate highway network nearby. Public transit serves the front gate of Moffett Field.

TRAVIS AIR FORCE BASE

Travis Air Force Base is an active military airfield when duty calls. The base was heavily used to transport military personnel back from the Persian Gulf conflict. The facility has 2 parallel 11,000 foot runways and significant passenger processing facilities.

State Route 12 and Interstate 80 provide ground access for Travis AFB.

Private Use General Aviation Airports

Over half of the private general aviation airports in the region are airfields made up of a short, unpaved runway (1,500 - 3,700 feet). The balance, hard surface runways, vary in length from 1,700 feet to 2,600 feet. All are without navigational aids. Minimal aircraft storage and support facilities are generally provided.

The Commodore Center Seaplane Base is located in lower Marin County. It has a 10,000 foot takeoff/landing area length.

BASED AIRCRAFT

This section presents based aircraft fleet mix data for the following groups of airports in the system: commercial service airports, public use general aviation airports, military airports, and heliports. The distribution of the based rotorcraft and of the total based aircraft by county is then illustrated.

The existing based aircraft are categorized as: single engine piston, multi-engine piston, jet, rotorcraft, and other. Single engine piston aircraft are typically privately owned airplanes used for recreation or training. Multi-engine piston may be aircraft used for this purpose as well as for corporate charter, and for air taxi or commuter flights. The jets based at the public use airports are mostly small business jets. Based rotorcraft are generally helicopters used in Emergency Medical Services (EMS) as well as commercial applications. A complete set of numbers is provided in the data summary table, Exhibit 4.23.

Commercial Service Airports

Most of the air carrier airports in the region are home to a significant number of general aviation aircraft. Concord, with 635, and San Jose, with 680, have the greatest number of based aircraft. Sonoma County airport has 454 based aircraft. Oakland, which has lost significant numbers of based general aviation aircraft in the past 10 years, now has 409 based aircraft, all of which are located at North Field. San Francisco, the exception to the above statement, has very few based general aviation aircraft (29) as most of the airport is devoted to passenger and air cargo activities.

Of the five commercial service airports in the region, San Jose is perhaps the dominant corporate/business airport, having the greatest number of twin engine piston powered aircraft, business jets, and rotorcraft. Oakland North Field has a similar focus reflected in their based aircraft mix, yet South Field has no based aircraft. San Francisco caters to the commercial aviation market as noted above.

General Aviation Airports

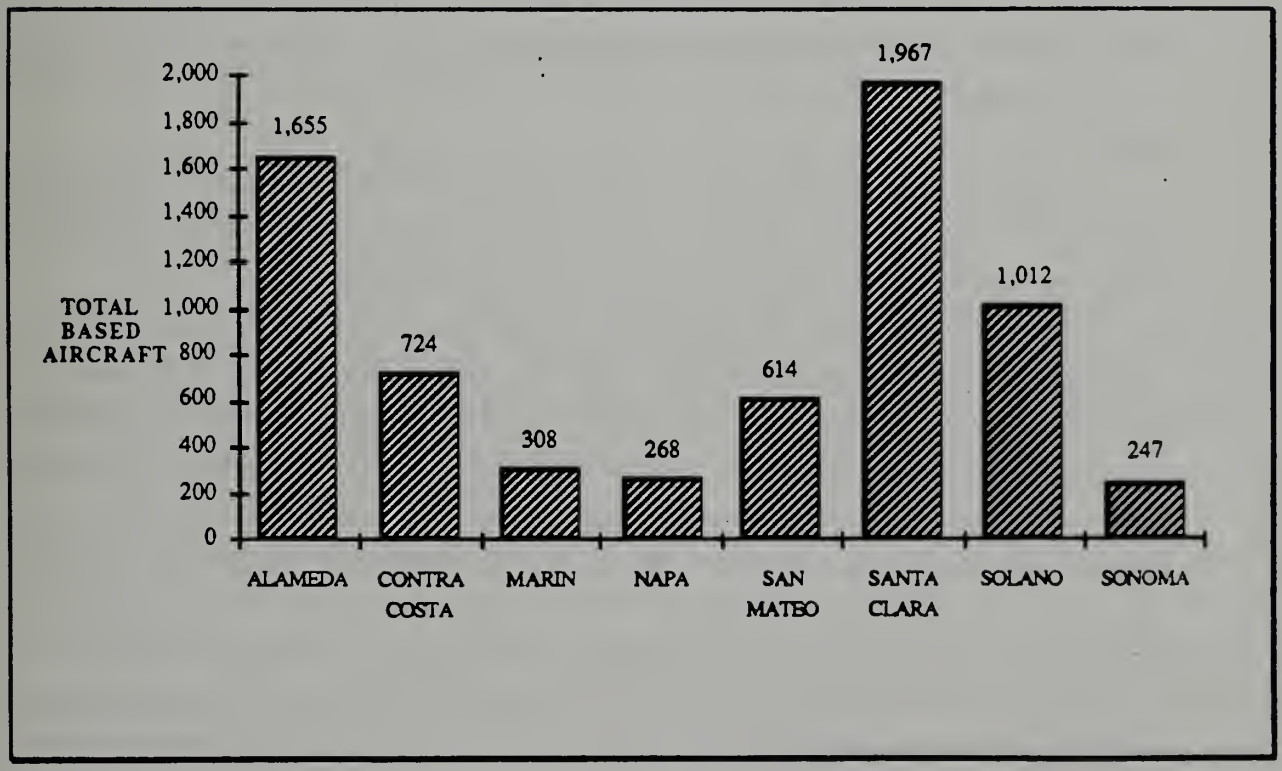
The number of based aircraft at the general aviation airports varies widely by facility. Several airports have over 600 based aircraft, most of which are single engine piston airplanes. Only Hayward, Livermore, and Santa Rosa Air Center have more than one based jet aircraft. Gnoss Field has one; the balance have none at all. The small number of rotorcraft in the system are based at a few GA airport locations across the region, including Hayward, Gnoss, Napa County,

Half Moon Bay, and Livermore. Few of the public use general aviation airports have based gliders except Byron, which has 24 gliders in the mix of based aircraft. At Sky Soaring, a prominent gliderport, 20 of the 23 based aircraft are gliders. The seaplane base in Marin County, Commodore Center, has 3 based aircraft.

Hayward Air Terminal has the largest number of twin engine aircraft, while Oakland has the most jets and rotorcraft. Of the 50 based jet aircraft in the system Oakland has 68% (34), while Hayward has some 18% of the total system's multi-engine GA aircraft (114 of 636). This reflects these two airports' importance to corporate and business aviation users. The chart below, Exhibit 4.14, displays the distribution of general aviation based aircraft by county, and clearly shows the dominance of Alameda and Santa Clara Counties in general aviation activity.

Exhibit 4.14

DISTRIBUTION OF BASED GENERAL AVIATION AIRCRAFT BY COUNTY (1990)



Military Airports

The aircraft based at the military facilities are quite varied in type and capability. The number may change at any time due to the state of the national defense. NAS Moffett Field, for example, functions primarily as a base and practice field for pilots of the P-3, the Lockheed Orion anti-submarine aircraft. Thus of the over 121 based aircraft (1988), about 74 are the P-3. Sixteen of these based aircraft are helicopters. NAS Alameda is home to some 56 U.S. Navy aircraft (1988) including approximately 16 Douglas A-4 Skyhawks, attack aircraft carried shipboard, 13 of the Vought A-7 Corsair II, also an attack jet, and 10 Douglas KA-3B Skywarriors, a refueling aircraft. The total includes 12 based helicopters. Hamilton Field currently has no based aircraft. Though it is used by the U.S. Coast Guard, they do not base any vehicles there.

Heliports

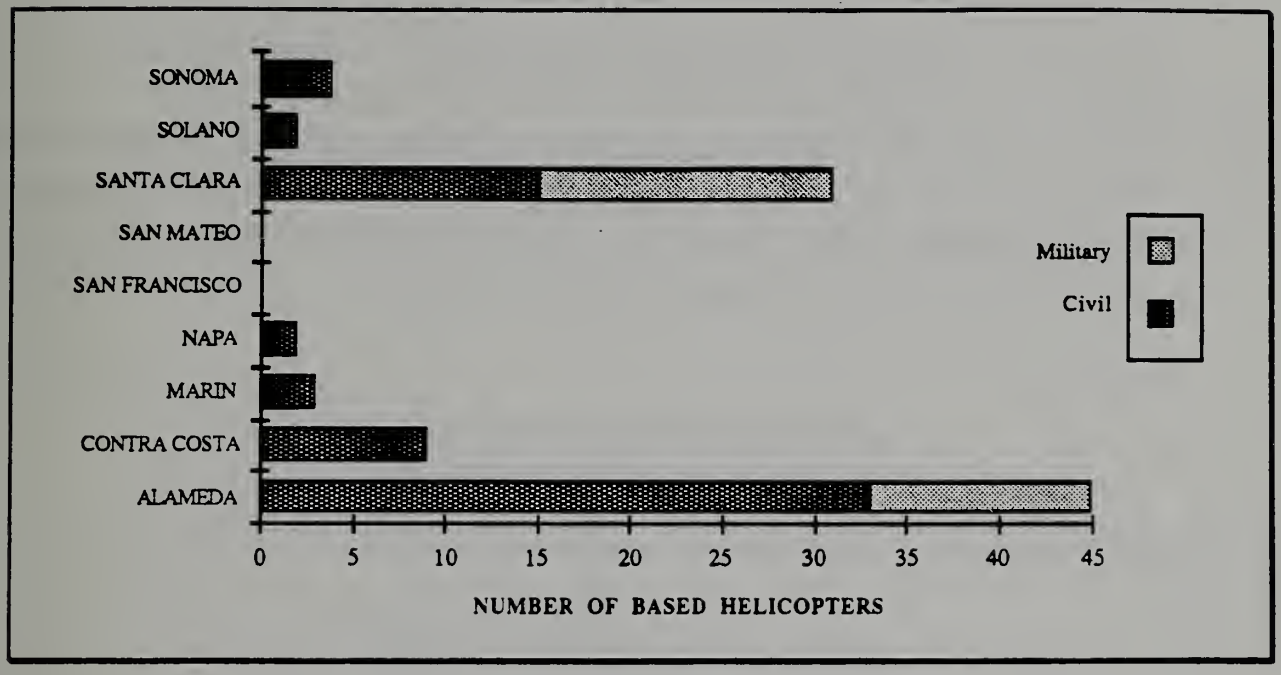
There are rotorcraft based at several of the airports in the region, with based operators serving a variety of clients. Many of the operators provide aircraft leasing services or flight services to these varying customers. The role of these based rotary-wing aircraft may include rescue, Emergency Medical Services (EMS), aerial inspection and photography, training, and corporate shuttle.

There are EMS operators in the region including CALSTAR (California Shock/Trauma Air Rescue) with its Aerospatiale AS-344 Twin Star based at Hayward Air Terminal, and Life Flight, which has its MBB BK-117 based at Stanford University Hospital.

The location of these based aircraft throughout the region illustrates in part the potential for quick response in the event of a natural disaster or large scale emergency. The largest number of based rotorcraft are housed at Oakland's North Field, San Jose International, Buchanan Field, and Hayward Air Terminal. Exhibit 4.15 shows the distribution of helicopters based at public use airports by county, and includes military helicopters. The rather limited number of public use heliports and private heliports region-wide suggests that few helicopters are unaccounted for in this survey, and this rotorcraft distribution will be representative of that overall. Exhibit 4.15 reveals that Alameda and Santa Clara Counties have by far the greatest number of based rotorcraft. This may be due to the nature of the activities in these counties; major military facilities are located there in addition to various corporate headquarters based in Alameda County and the high-tech business corridor in Santa Clara County. San Mateo and San Francisco counties have a scarce supply of based helicopters as do Solano and Napa counties.

Exhibit 4.15

DISTRIBUTION OF BASED ROTORCRAFT BY COUNTY (1990)



AIRPORT ACTIVITY

Information about airport activity was collected for the year 1990 to document current levels and to provide a basis for forecasting. Airport activity information listed here includes enplaned passengers, annual aircraft operations, peak hour operations, and annual air cargo volume. The numbers are catalogued in Exhibit 4.23.

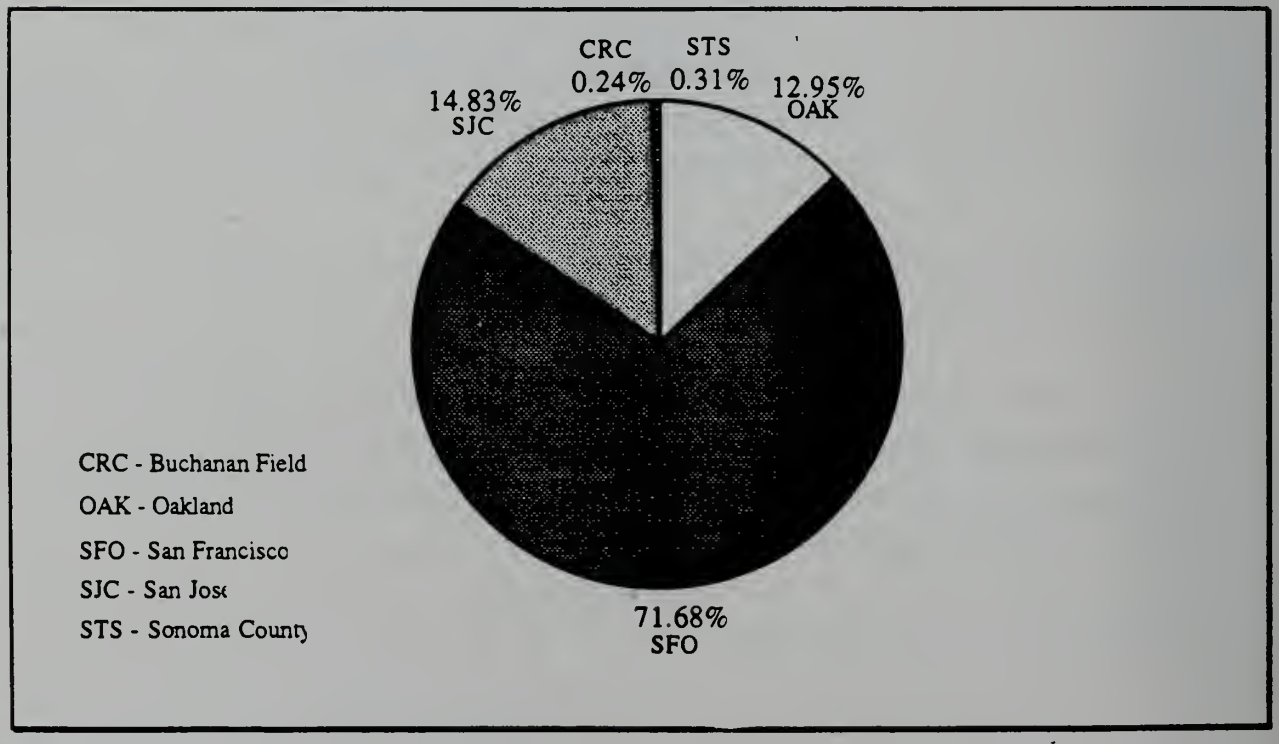
Commercial Service Airports

By definition the commercial service airports have air carrier operations on the airfield. An air carrier is an airline with scheduled transport of passengers or cargo. An air taxi is a carrier hired for transport using small aircraft (60 seats or less). Air taxi service with published flight schedules is referred to as commuter air carrier service. Commuter service is frequently referred to as *regional* service.

Commercial service airports maintain records of the number of enplaned passengers as a measure of the air carrier activity at the airport. The enplanement count encompasses scheduled air carriers, including commuters, but does not contain transfer passengers. The five commercial service airports enplaned 21,175,645 passengers in 1990. San Francisco International Airport enplaned 15,177,669 passengers, which is 71.7% of the region's total. San Jose enplaned 3,140,000 passengers (14.8% of the region's total) and Oakland enplaned 2,742,000 passengers (12.9%). Buchanan Field and Sonoma County enplaned 50,000 and 65,765 passengers respectively, accounting for the remaining 0.6% of the region's total annual passengers. The distribution of passenger enplanements is illustrated in Exhibit 4.16.

Exhibit 4.16

AIR CARRIER PASSENGER ENPLANEMENTS (1990)
DISTRIBUTION BY AIRPORT



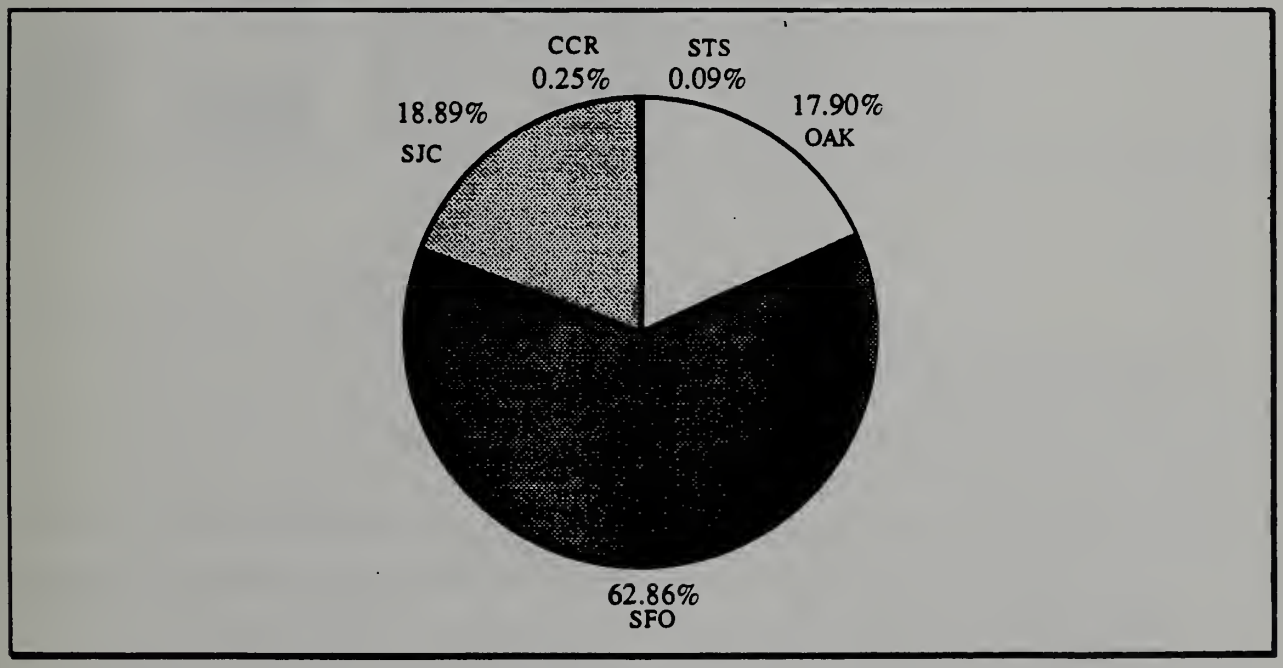
In 1990 San Francisco had over 430,000 operations. More than 90% of these were either commercial passenger flights or commuter operations. Although this still made SFO the busiest airport in the region, its share of the region's air carrier operations was only 65%, compared to its nearly 72% of the region's total passengers. Similarly its share of commuter/air-taxi plus air

carrier operations was 58% of the total. Two factors may account for this: (1) many of SFO's international and other longer distance flights use larger passenger capacity aircraft; (2) SFO flights tend to have have higher load factors. In other words, SFO serves more passengers on more flights with larger aircraft and at higher load factors.

San Jose saw a total of 95,778 air carrier operations in 1990 (19.5% of the region's total) while Oakland South Field had 74,000 (15.1% of the total for the region). Concord, with 1,285 air carrier operations, accounted for 0.3% of the total, and Sonoma County, with 439 air carrier operations, had 0.1% of the region's total. Exhibit 4.17 shows the distribution of air carrier operations by airport.

Exhibit 4.17

AIR CARRIER OPERATIONS (1990)
DISTRIBUTION BY AIRPORT

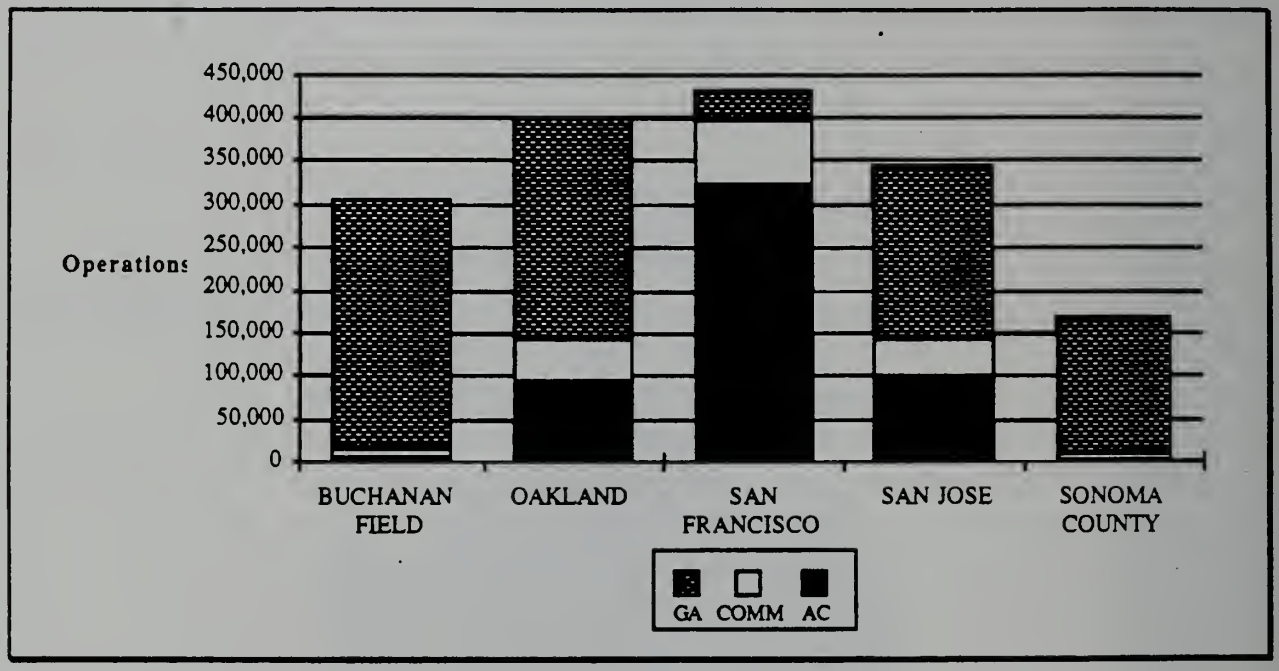


The following chart, Exhibit 4.18, displays the breakdown of total 1990 operations by type for the five commercial service airports. San Francisco has the highest volume of operations overall, including the greatest number of commuter and air taxi flights. Many of these flights provide regional connections for commercial air carrier operations. The total number of operations

at Oakland International follows next behind that of San Francisco International. Most of the operations at Buchanan Field and Sonoma County are clearly devoted to general aviation, with some regional traffic and few air carrier movements per facility.

Exhibit 4.18

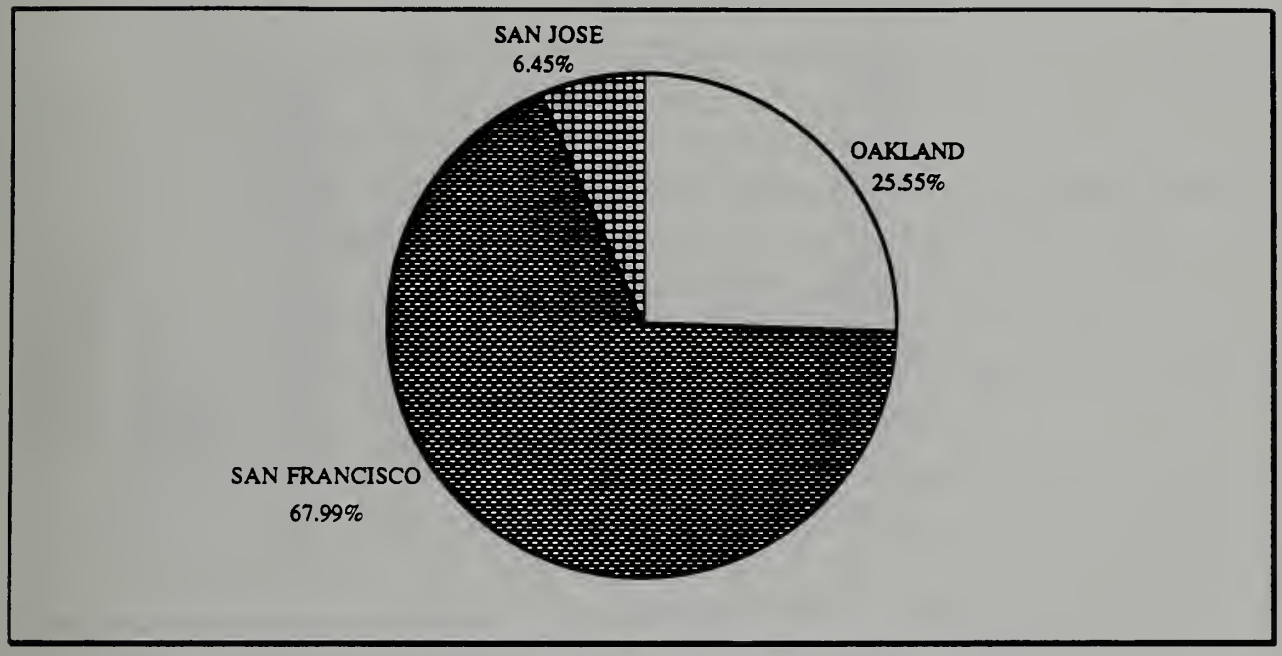
OPERATIONS BREAKDOWN BY AIR CARRIER AIRPORT (1990)



Air cargo activity for the year 1990 is concentrated at San Francisco and Oakland, with nearly 94% of the region's total air cargo processed at these two airports. The primary difference between the two is that most of San Francisco's cargo is belly and traditional air cargo, while Oakland has focused on overnight small package cargo operations, evident by the large presence of Federal Express. This is reflected in the numbers of all cargo operations at each airport. San Jose processes less air cargo (some 60,000 tons, or about 6% of the region's total). Concord and Sonoma County have very little air cargo activity, levels mostly attributable to local demand for overnight package services such as Federal Express and UPS. They have no appreciable all cargo operations. The air cargo activity split is illustrated in Exhibit 4.19.

Exhibit 4.19

DISTRIBUTION OF AIR CARGO (Tons, 1990)



General Aviation Airports

A few of the facilities have significant levels of operations. Hayward, Livermore, and Reid-Hillview had over 200,000 operations each in 1990. Gnoss, Napa County, Nut Tree, San Carlos, and South County have over 100,000 annual movements. Others, such as Byron, Cloverdale, Parrett Field, Rio Vista, and Sonoma Sky Park, have fewer than 20,000 annual operations. These airports also have small numbers of based aircraft.

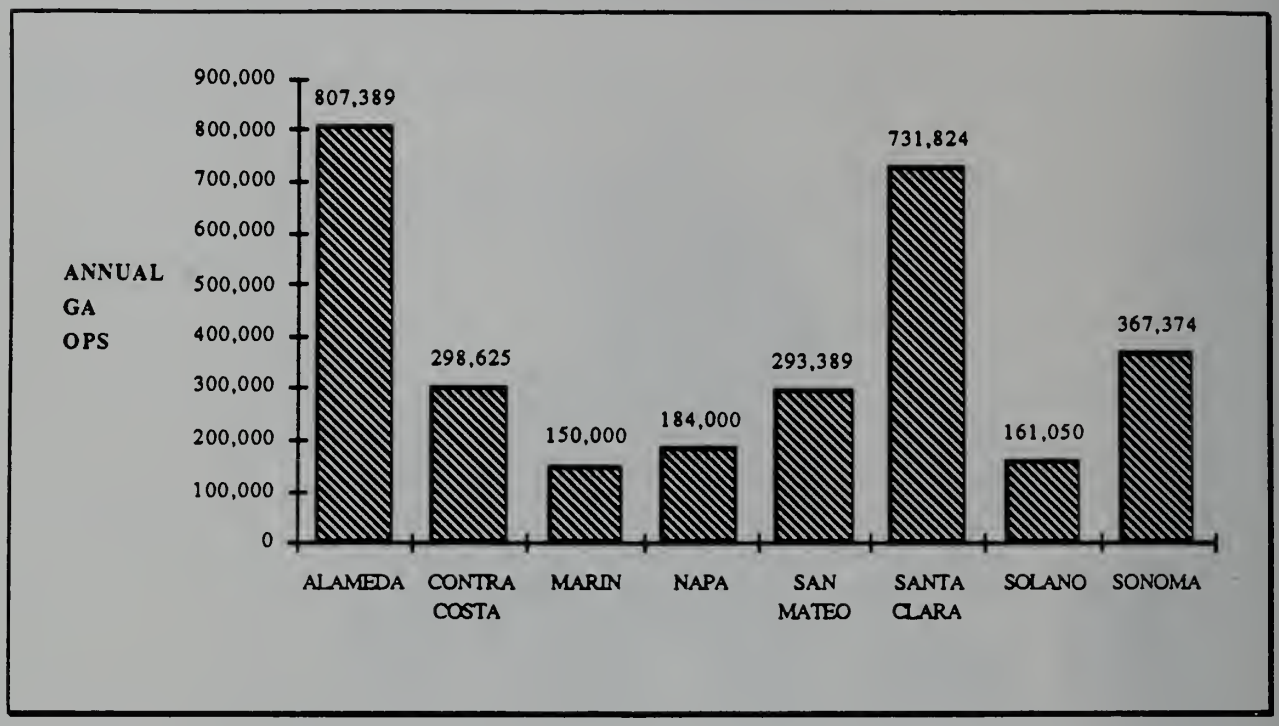
Exhibit 4.20 shows the distribution of general aviation operations by county. Comparison with Exhibit 4.14 illustrating the based aircraft distribution by county is somewhat revealing. Santa Clara County has the greatest percentage of based aircraft, but does not match the number of general aviation operations in Alameda County.

Military Airports

Awaiting data

Exhibit 4.20

DISTRIBUTION OF GENERAL AVIATION OPERATIONS BY COUNTY (1990)



CAPACITY

Comparison of existing facility capacity and existing levels of demand make it possible to assess the individual airports' ability to accommodate growth in activity. The capability analysis includes airside facility capacity and landside facility capacity. Airside facility capacity measures include peak hour runway capacity and annual runway capacity, expressed as annual service volume. Landside capacity components include based aircraft capacity, passenger terminal capacity, and air cargo capacity. Generally accepted methodologies exist for determining runway capacity, but methods for determining overall passenger terminal or air cargo facility capacity are not fully developed.

Airside Facilities

Airport airside capacity may be limited by a number of factors, including runway capacity, taxiway capacity, or gate capacity. The FAA has established standards for in-trail and lateral

separations of aircraft which take into account air traffic control capabilities, fleet mix, and airfield configuration, and these affect the airside operational capacity. Operational constraints also include the length of the runways and the structural integrity of their pavement system. Larger aircraft need lengthy runways, and repeated utilization by heavier aircraft requires substantial runway strength.

The Annual Service Volume (ASV) is defined by the FAA Advisory Circular on Airport Capacity and Delay (FAA AC 150/5060-5) as *a reasonable estimate* of an airport's annual capacity. Differences in the number of runways and their configuration, runway use, aircraft mix, and weather are incorporated within the ASV value. The capacities at the commercial service airports in the region thus differ widely. Oakland and San Francisco have the highest annual capacities, each at or just in excess of 500,000 operations per year. The air carrier runway at Oakland has an ASV of 147,870 aircraft, North Field has 352,130. San Jose may accommodate 355,000 operations annually, and Concord and Sonoma County have service volumes of approximately 300,000 operations each.

Total peak hour capacity is noted as another constraint on the airport throughput. Both the capacities in visual flight conditions,VFR and instrument flight conditions, IFR have been included because dramatic reductions result from severe weather conditions. San Francisco exemplifies this significant change as it moves from 105 aircraft per hour VFR to 33 aircraft IFR. Similarly, San Jose has its airspace capacity restricted to a single instrument approach during IFR conditions.

As a region the general aviation airports are currently utilizing about 50% of the total annual airside capacity. The situation varies airport to airport. Byron, Cloverdale, Rio Vista, and Sonoma Sky Park are operating at less than 10% of their annual runway capacity. These airports have relatively low numbers of based aircraft as well. Other, larger airports are using much more of their runway capacity, including Gnoss Field at 65%, Livermore at 90% and San Carlos at 68%. The other general aviation airports range from 25% to 55% of their annual runway capacity. The commercial service airports are using over 80% of the available airside capacity.

The approach of the aircraft activity level to the annual service volume in the case of the commercial airports and at select general aviation airports signals a need to examine possible capacity expansion. Average aircraft delay will increase rapidly as the ASV is approached.

The commercial service airports are constrained considerably in the peak hour. Demand for runway access exceeds capacity in IFR conditions. To design exclusively for the peak hour has long been recognized in transportation to be excessive. The existing condition indicates, though, that substantial delays occur in the peak hour.

Landside Facilities

Landside facility considerations other than based aircraft capacity are addressed for the air carrier airports only. Landside activity limitations include the passenger terminal size, number of auto parking spaces, vehicular access, and aircraft parking capacity. To date insufficient research has been done to establish standards for passenger terminal capacities.

Current passenger capacity estimates at the three large commercial service airports are: 30 million for San Francisco, 8.5 million for Oakland, and 11.8 million for San Jose. San Jose has a terminal capacity shortfall. Single level Terminal C which houses nine airlines plus two commuter carriers is operating above design capacity, with some functions temporarily located at non-terminal building sites. San Francisco International has insufficient domestic and international terminal capacity. The passenger terminal at Oakland has immediate baggage handling and security shortfalls, but with the recent addition of 5 new gates has an adequate terminal capacity availability.

Ease of vehicular access and auto parking are also rather important capacity considerations. Measures include on site roadway level of service and curbside congestion. Roadway level of service is a measure of traffic flow conditions designated by the letters A through F, with A the highest level or best condition on the scale. San Jose has a current roadway Level of Service A. They are lacking in rental car parking, though. Oakland has considerable congestion at the passenger loading/unloading areas. Terminal access roadways at San Francisco International are inadequate in the peak periods when congested conditions develop around the terminal curbside, but seem to have sufficient long term and short term public parking space. Regional access is being improved by the work on U.S. Highway 101.

The based aircraft capacity at these facilities is ample, for the most part. This number is a total of the open tiedowns, shelters, t-hangers, and conventional hangers available for based aircraft parking. Concord, Sonoma County, Oakland, and San Jose have a relatively comparable number of spaces for based aircraft. The range is from 641 at Oakland, to 729 at Buchanan field. Oakland is at 64% of its based aircraft capacity and San Jose is feeling some pressure, currently operating at close to 100% of its based aircraft capacity. San Francisco International differs, offering 46 general aviation based aircraft places available (the 29 existing based aircraft represent 63% of capacity). Three of these commercial facilities, San Jose and San Francisco excluded, can currently support significant increases in their based general aviation activity.

The general aviation element of the airport system is currently at just under 80% of the total based aircraft capacity. Those airports having the highest occupancy rates are Byron (115.6%), Gnoss Field (97.2%), Hayward (127.8%), Nut Tree (103.8%), San Carlos (90.7%), and South County (130.7%). At the other end of the spectrum are Half Moon Bay at 56.6% of capacity, Napa County at 46%, and Santa Rosa Air Center at 38.3%.

Of more importance than total system capacity, however, is the regional distribution of available capacity in relation to demand. Santa Clara County, for example, has a total of only 463 based aircraft vacancies, and faces the potential loss of the general aviation capacity of Reid-Hillview and San Jose (with 806 and 670 based aircraft spots respectively). Alameda County's three general aviation airports are also heavily used, and have high based aircraft capacity utilization rates. This is rather important for Alameda is home to 26% of the based aircraft capacity in the region. Hayward Air Terminal is well beyond its capacity of 521 based aircraft and Livermore has 75% of its 773 spaces filled, while Oakland North Field has some room to grow, currently at 64% of based aircraft capacity. Buchanan Field and Byron serve Contra Costa County. Byron is currently over capacity and Buchanan Field sits at 87.1% filled. Available based aircraft parking may soon not meet the overall regional demand. Areas such as Santa Clara County may find themselves aircraft parking poor if certain circumstances prevail.

CONSTRAINTS

Previous sections outlined existing airport facilities, levels of airport activity, numbers of based aircraft, and the airports' physical capability to accommodate current and future demand. There are additional factors beyond the airports' physical capacity, however, which place limitations on how much activity can and will take place at each airport. These constraints are airspace, environmental, physical, and policy.

Airspace constraints relate to regional airspace issues. The nine-county region contains over 50 airports which in 1990 generated over 4,000,000 operations. This translates to almost 11,000 operations in the region every day. The region's five commercial service airports enplaned over 21,000,000 total passengers in 1990, making it the sixth busiest region in the nation. With this level of aviation activity the regional airspace is congested and complex. From an air traffic standpoint all of the region's airports are interrelated, and affect each other. In planning for the total airport system it is therefore necessary to evaluate the airspace environment.

Environmental constraints as discussed here are those related to the natural environment, including such things as wildlife, wetlands, and San Francisco Bay. Two of the major commercial airports, Oakland and San Francisco, are situated on the Bay, and host a variety of wildlife. Development at Oakland is also affected by the presence of non-Bay wetland areas. Wetlands exist to a lesser degree at other airports as well. Construction of new runways which affect wetlands or require Bay fill will not meet with general favor. Public opposition to capacity increasing measures may be strong and well organized.

Physical constraints may be manifested in a variety of ways, including such things as limited airport size or the presence of physical barriers to growth such as highways, railroads, rivers, or buildings.

Policy constraints include noise, safety, and other community compatibility issues. In the face of such constraints, individual facilities may find it difficult to expand in order to meet growing demand. Land and airside expansion may be questioned by the interests for the environment and of the community. Neighborhoods affected by overflight noise will be reluctant to allow growth which will promote substantial increases in commercial aircraft activity, and the noise which may some with that activity. Terminal expansion, for example, may be viewed by residents affected by aircraft noise as a vehicle for bringing many more flights overhead with the additional passenger processing capability, and opposed as strongly as runway capacity increases. Other constraints on airport utilization include restrictions placed upon air traffic due to community concern. These additional qualifications may supersede the theoretical operating capacities discussed above.

These constraints have historically shaped the growth and development of the entire regional airport system, and will continue to do so in the future. This section identifies limitations on current operations and addresses factors potentially constraining future airport development and growth. These constraints are discussed in some detail for the individual commercial service airports and more generally for the military, general aviation, and heliport.

Airspace Constraints

Safety is the greatest concern in aviation and to maintain safe conditions limitations have been imposed by the FAA in order to manage the regional airspace. New technological advancements, when developed and implemented, may allow for more aircraft to be safely processed within the terminal areas.

There is a substantial amount of interaction among the operations at the numerous airports in the region, requiring an established user's hierarchy for normal (non-emergency) conditions. The air traffic pattern at San Francisco International is dominant because the volume of air carrier traffic generated as a percentage of the total is so much greater than that of the other airports, and traffic associated with other facilities must conform.

The operations at military facilities in the region can cause flight delays into and out of nearby commercial airports as the FAA recognizes the importance of United States defense requirements. Civil flights will have to yield to military operations. The proximity of Alameda NAS to Oakland will affect Oakland operations though a minimal number of interruptions will occur in a year.

Other conflicts due to proximity are several. In instrument conditions, conflict between aircraft simultaneously approaching Hayward and Oakland will result in a delay to that using Hayward Air Terminal.

Flight in the region is regulated by various controls and restrictions identified by the FAA. These may hinder flight in the region.

Controlled airspace is identified in the following ways:

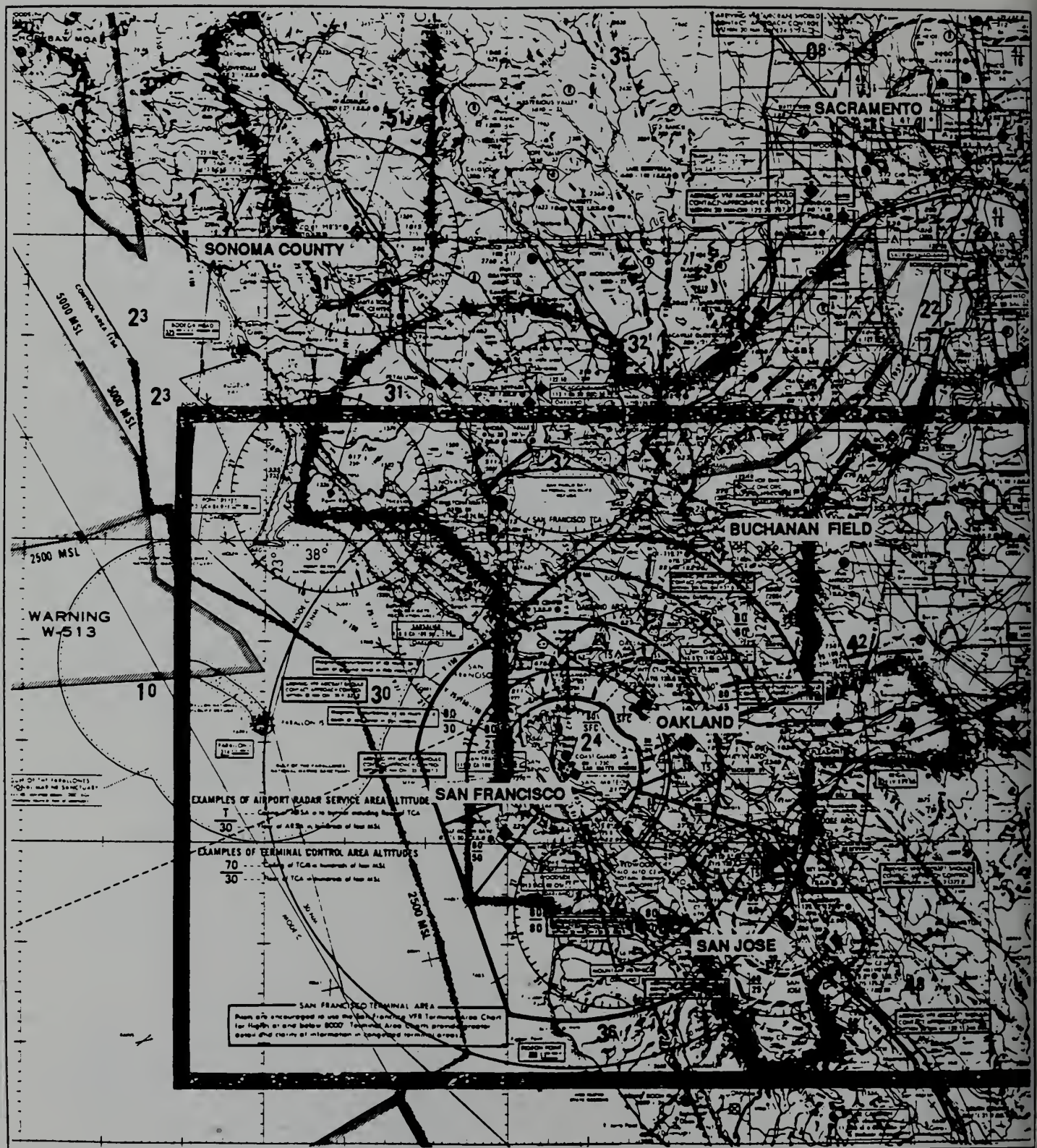
- Terminal Control Areas (TCA): [permission and communication required, speed restricted]
- Terminal Radar Service Areas (TRSA) : [no permission required, communication required, speed restricted]
- Airport Radar Service Areas (ARSA): [permission required, speed restricted]
- Control Zones: [permission req'd, contact req'd IFR, speed restricted]
- Control Areas: [permission req'd, contact req'd IFR, speed restricted]
- Transition Areas: [permission req'd, contact req'd IFR, speed restricted]
- Continental Control Areas: [permission and communication required IFR, speed restricted]
- Positive Control Areas: [entry prohibited VFR , permission and communication required IFR]

Special Use Airspace includes:

- Alert Areas: [no permission to enter, communication required IFR, speed restrictions]
- Controlled Firing Areas: [speed restricted]
- Military Ops Areas: [restricted entry]
- Prohibited Areas: [no entry permitted]
- Restricted Areas: [permission required, speed restricted]
- Warning Areas: [communication required IFR]

In the study region, San Francisco is a Terminal Control Area. Oakland and San Jose are Airport Radar Service Areas. The airspace is mapped in Exhibit 4.21.

The chart in Exhibit 4.22 indicates the type of airspace for airports in the study region.



Source: NOAA-San Francisco Sectional Aeronautical Chart.

MTC

Regional Airport System Plan

Exhibit 4.22

AIRSPACE

Exhibit 4.22

TYPE OF AIRSPACE BY AIRPORT

MAJOR COMMERCIAL SERVICE AIRPORTS	CONTROL ZONE	In or TCA	Under ARSA	STANDARD INSTRUMENT DEPARTURE	STD. TERMINAL ARRIVAL ROUTE
BUCHANAN FIELD	Y				Y
OAKLAND INT'L	Y	Y	Y	Y	Y
SAN FRANCISCO INT'L	Y	Y		Y	Y
SAN JOSE INT'L	Y		Y	Y	Y
SONOMA COUNTY	Y			Y	
GA/MILITARY AIRPORTS					
ALAMEDA NAS	Y	Y	Y		
BYRON					
CLOVERDALE MUNICIPAL					
GNOSS FIELD	Y				
HAMILTON AFB	Y	Y			
HALF MOON BAY		Y			
HAYWARD AIR TERMINAL	Y	Y	Y		
HEALDSBURG MUNICIPAL	Y				
LIVERMORE MUNICIPAL	Y				
MOFFETT FIELD	Y	Y	Y		
NAPA COUNTY	Y			Y	
NUT TREE	Y				
PALO ALTO	Y	Y			
PARRETT FIELD					
PETALUMA MUNICIPAL	Y				
REID-HILLVIEW	Y				
RIO VISTA MUNICIPAL	Y				
SAN CARLOS	Y	Y			
SANTA ROSA AIR CENTER	Y				
SKY SOARING	Y	Y			
SONOMA SKY PARK	Y				
SONOMA VALLEY	Y				
SOUTH COUNTY					
TRAVIS AFB	Y				

SOURCE:
Adapted from CALTRANS CASP Inventory, August, 1990

Environmental, Physical, and Policy Constraints

Future growth will be limited by on site development constraints, qualified here. Constraints on facility expansion will be noted for the major commercial airports and the others for whom the issue is quite significant.

SAN FRANCISCO

The San Francisco International Airport plays an important role in the community, and in working toward being a good neighbor has had to restrict its activities in several ways. Regulation has long been instituted at San Francisco International to control the noise affecting the community. Most recent noise abatement regulation was instituted in 1988 by the Airports Commission, and restricts airport noise by requiring conversion by operators to quieter Stage 3 aircraft and limiting nighttime use by aircraft other than Stage 3 type. The Airports Commission is now studying the possible modification of the runway configuration to relieve noise impacts on incompatible areas.

Additionally, SFO is constrained by the absence of sufficient land area for a new runway and passenger terminal development. The airport is landlocked by the Bayshore Freeway (Highway 101) to the west, and San Francisco Bay to the north, east, and south. Any major new runway development would likely involve Bay fill. There are a number of undeveloped areas on site, identified already in the facilities section of this chapter, which could be used for support facilities. Future development at the airport is limited to these parcels or to redevelopment of existing facilities.

OAKLAND

Metropolitan Oakland International Airport has no curfew and no limit on the number of daily or annual operations. It does enforce noise abatement procedures to reduce noise impacts on the residential communities around the airport.

Although Oakland airport has considerable land area which could accommodate development of passenger, air cargo, general aviation, or other facilities, the airport has significant areas of environmentally sensitive property. These areas have created development constraints at Oakland in the past. These include habitat for endangered species at the west end of runway 11-29; scattered wetland areas throughout the airport; several open water areas; and scattered wildlife habitat related to these wetlands. Although these areas do not significantly constrain passenger terminal development, they may limit the long term development of air cargo, aircraft maintenance, and other support facilities.

In addition, Oakland is constrained by the presence of San Francisco Bay to the southeast, southwest, and northwest of the primary air carrier runway. Extension of this runway would involve Bay fill. Construction of an additional air carrier runway at South Field would involve either Bay or wetland fill, or both. Either of these options may face strong political opposition.

SAN JOSE

San Jose International Airport has established a number of operational restrictions to address the noise and safety issues, and to reduce the airport's impacts on adjoining communities. In addition to noise abatement flight tracks and arrival and departure procedures, San Jose has established a curfew which limits the hours of airport operation. The airport is closed between the hours of 11:30 PM and 6:30 AM. This limits the total daily activity which can occur at the airport, and also creates some congestion during the morning hours. If continued into the future, the curfew will constrain activity at the airport and cause increased congestion within the available operating time envelope.

San Jose International Airport is located within an intensely developed urban area and operates on an extremely limited site. The 1,050-acre site is not sufficient to accommodate all aviation demands. As a result, future development will involve difficult choices between competing sectors, including passenger facilities, air cargo development, and general aviation.

Because of its location and limited size, San Jose is highly constrained by existing development. The runway system is limited in length by the Bayshore freeway (highway 101) on the north and Interstate 880 on the south. To the west and east the airport is limited by urban development and the Guadalupe River, respectively. The passenger terminal area is also highly constrained by the size and shape of the land available between the runways and the airport access road and the river. In addition, the presence of high rise towers in the vicinity of the airport will constrain the airport in its planning for facility improvements and operational expansion.

CONCORD

Nestled in the northern part of Contra Costa County, Buchanan Field has, by County policy, placed limitations on both its general aviation and commercial airline capacity. The total number of based aircraft is limited to a maximum of 850 spaces, a level forecasted in the Master Plan for the year 2005. Along with this restriction on growth of general aviation activity, air carrier and commuter airline service are limited. Air carrier service is capped by policy at 7 flights daily, and the commuter service is held at a similar level, leaving the enplaned passenger potential at less than 180,000 in the year 2010, according to their Master Plan. Pavement strength and runway length will create their own restrictions on air carrier possibilities, they noted. Physical restraints prevent runway extension.

SONOMA COUNTY

The County of Sonoma has placed restrictions on its airport operations and facilities development in order to meet its goal of safe and compatible air service. Commercial air carrier flights at Sonoma County Airport, involving commuter and scheduled airline service, are restricted in number and in combination by the County. Of the 21 commercial departures permitted daily, scheduled air carriers may use only up to 14 of the 21 available slots, and commuters may utilize up to 13 of the total number of departure spaces available. Aircraft used in eight departure slots held for scheduled airlines are required to have 50 seat capacity. Length of runway, for new or existing construction, is held at 5,000 feet, and runway strengthening is deemed undesirable, with a 95,000 pound limit therefore on gross takeoff and landing weight.

Military Airports

Alameda NAS is in a highly developed area which almost precludes future facility expansion. Possible development on the Alameda Estuary nearby could encroach on operations. Also, office development in downtown Oakland may obstruct Alameda NAS airspace. Airspace capacity is also realistically a concern when considering any growth in their operations. The community is concerned with the activities at this military facility, and has limited approaches to Runway 7-25.

Many groups have interest in the future of Hamilton Field as it is also in a well developed area of the region, located in Marin County. Hamilton Field has property which includes many wetland areas, and as redevelopment of the land is considered, their preservation may be a prominent concern. The land is valuable and there is possible pressure to sell the land for other development. If there is a rise in the number of flights, there is a potential for neighborhood objection to noise levels.

NAS Moffett Field is surrounded by communities, which makes it difficult for it to be a completely compatible neighbor. Close to 900 units of Navy and Air Force family housing on site could be affected by additional aircraft operations.

Travis AFB is in the less densely populated area of northern Solano County, near the city of Fairfield. The joint use agreement between the County of Solano and the U.S. Air Force limits the number of operations to twelve per calendar day. Scheduled air carrier operations only are permitted. This agreement was established in 1971.

General Aviation Airports

Many of the same issues facing the larger airports will be met by the smaller ones. Noise is the major environmental issue even in neighborhoods surrounding facilities catering to small aircraft. Communities are also concerned for safety and air and water quality. The airports may also be landlocked. Those most affected are listed here.

- Fremont
- Gnoss
- Hayward
- Reid-Hillview
- San Carlos

Heliports

The Bay Area has a rather negative public perception of heliports and helicopters. The noise generated by helicopters is slightly different from that of conventional aircraft and is easily recognizable. Rotorcraft often fly overhead at lower altitudes making them more conspicuous. Noise abatement procedures and operator-community cooperation can perhaps over come the difficulties of the helicopter's disrepute.

Airport Plans / Capital Improvement Programs (CIP'S)

The master plans of each airport have been reviewed to identify future improvements and anticipated facility expansion by airport. Examination of their capital improvement programs (CIP's) will provide clues to the funding levels and areas in which they are focused. Plans and policies of agencies at varying levels of government who may affect future change are also identified.

Airport Plans

Detailed information about the regional air carrier airports' master plans is provided, with a summary of general aviation airport plans.

SAN FRANCISCO

San Francisco International Airport plans to accommodate future growth by expanding and improving passenger and cargo processing facilities and maintenance facilities. Less emphasis has been placed on airfield modifications. Their Master Plan, completed in November of 1989, identifies various improvements for initiation in the near term, Fiscal Year 1989- 1996, and the long term, Fiscal Year 1997 - 2006.

Near Term

Terminal

• The International Terminal will be replaced by a new facility with a consolidated airport administration space.

Ground Transportation

• A Ground Transportation Center (GTC) will be developed to consolidate ground transportation activities currently scattered curbside. The new structures, one on each side of the airport entry road will be connected to the terminal area by an automated people mover system.

Airline Maintenance Facilities

• Existing Pan Am maintenance/administration facility will be relocated to the north due to construction of new Boarding Area A.

• An East Field maintenance hanger complex to be located on a presently undeveloped parcel will allow for consolidation of aircraft maintenance facilities.

General Aviation Facilities

• Existing GA facilities and the fixed based operators are to be relocated form the West Field to the East Field in order to reconfigure air freight operations.

Air Freight

• West Field and North Field apron and ground access will be restructured to allow for more room to process air freight.

Parking

• Additional short term public parking will be made available with the construction of the Ground Transportation Center.

• At two sites long term public parking will be added.

Roadway

• New two level roadway system will be constructed to serve the International Terminal and the GTC.

• The CALTRANS interchange will better separate incoming traffic.

Airfield

• Installation of a Microwave Landing System.

• Extension of Taxiway L to Runway 19L.

• Extension of Taxiway V to Taxiway L.

• Construction of high speed exit taxiway Z at Runway 19L and Taxiway F.

• Construction of high speed exit taxiway Y at Runway 10L and Taxiway L.

Long Term

Terminal

• Replace eastern section of Boarding Area B

Public Transportation

• Extend APM to Lot D - long term public parking

• Connect APM to possible BART station on west of Bayshore parcel

Air Freight

• Added air freight/maintenance facilities in the West Field area

• Addition to U.S. Mail Processing Facility

Commercial/Office

• Develop commercial office building on site

Airfield

• Expand South Terminal ramp area to accommodate reconfiguration of Boarding Area B.

• Realign Taxiways A and B.

OAKLAND

Oakland's plans involve meeting growth in air carrier operations by improving airside capacity and acting on many landside improvements. The air cargo market is important to them as is the general aviation market. Plans include:

- Construct new air carrier runway with parallel taxiway
- Expand terminal to 42 gates
- Construct parking garage
- Terminal roadway improvements
- Develop additional 100 acres for air cargo
- Develop expanded GA apron and tie-downs
- Construct new ARFF facility
- Construct new international arrivals facility
- Construct BART connection

SAN JOSE

Future plans at San Jose International include work on both the air side and land side of the airport. Their master plan should be completed by mid-1991.

Airfield

- Extend runway 12L-30R to 8,900 feet (included in previously adopted master plan)
- Reworking of the taxiways.
- Pavement management rehabilitation work on the airfield.

Terminal

- Reconstruction of passenger terminal C and construction of new passenger terminal B.
- Construction of a new air traffic control tower.

Parking

- Construct new parking garages.

General Aviation

- Relocation of all GA to west side of airport.
- Reduce total number of GA based aircraft.

Air Freight
• New air cargo facilities.

Other
• Installation of a fuel farm.

Roadway
• Terminal area roadway improvements .

BUCHANAN FIELD

The Buchanan Field master plan is a balanced response to anticipated general aviation and air carrier/commuter demand. They have focused their efforts on best utilizing available land on site, respectful of the existing airport configuration. No runway extension has been suggested, but there will be work done on the taxiway system. This master plan was completed in 1988.

Airfield
• Redesign taxiway system leading to Runway 32-L and nearby multi-taxiway intersection.
• New Taxiway M parallel to Runway 1L-19R.

General Aviation
• Increase GA parking from 629 spaces to 849 based aircraft parking spaces
• Increase transient aircraft parking form 37 to 69 spaces.
• Add other hangar spaces and tiedowns

Terminal
• Construction of an airline terminal on the west side of the airport to accommodate 180,000 annual enplaned passengers and a restaurant. There would be 700 adjacent auto parking spaces.

Other
• Crash/fire/rescue building
• A fuel farm

SONOMA COUNTY

Forthcoming

County, Other Plans

Sonoma County is recommending removing Santa Rosa Air Center from use because it is not compatible with is surroundings. The county is home to a fair number of the region's based aircraft. Consideration is also being given currently to the closing of Reid-Hillview in Santa Clara County.

Capital Improvement Programs

Forthcoming

Exhibit 4.23

MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE – PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	OWNERSHIP	LOCATION (COUNTY)	AIRPORT CLASS.	NUMBER OF RUNWAYS	LENGTH OF LONGEST RUNWAY	INSTRUMENT APPROACH	ATC TOWER	ROTORCRAFT FACILITIES	AIRPORT SIZE IN ACRES	AUTO PARKING LOT CAPACITY
BUCHANAN FIELD	PUBLIC	CONTRA COSTA	TRANSPORT	4	4,400	NON-PRECISION	YES	3 HELIPADS	578	
OAKLAND (S. FIELD)	PUBLIC	ALAMEDA	TRANSPORT	1	10,000	PRECISION	YES	HELIPAD	1,600	6,300
SAN FRANCISCO INT'L	PUBLIC	SAN MATEO	TRANSPORT	4	11,870	PRECISION	YES	OPS	5,270	9,338
SAN JOSE INT'L	PUBLIC	SANTA CLARA	TRANSPORT	3	8,899	PRECISION	YES	OPS	1,050	8,250
SONOMA COUNTY	PUBLIC	SONOMA	GU	2	5,115	PRECISION	YES	2 HELIPADS	940	
COMMERCIAL SUB-TOTAL									9,438	23,888
GA/MILITARY AIRPORTS										
ALAMEDA NAS	MILITARY	ALAMEDA	MILITARY	2	8,000	PRECISION	YES	2 HELIPADS	1,521	
BYRON	PUBLIC	CONTRA COSTA	BU	2	2,800	NONE	NO		305	
CLOVERDALE MUNICIPAL	PUBLIC	SONOMA	BU	1	3,155	NONE	NO		58	
GNOSS FIELD	PUBLIC	MARIN	BU	1	3,300	NONE	NO	OPS	90	
HALF MOON BAY	PUBLIC	SAN MATEO	BU	1	5,000	NONE	NO	OPS	325	
HAMILTON FIELD	MILITARY	MARIN	MILITARY	1	8,000	PRECISION	NO			
HAYWARD AIR TERMINAL	PUBLIC	ALAMEDA	TRANSPORT	2	5,024	PRECISION	YES	2 HELIPADS	543	
HEALDSBURG MUNICIPAL	PUBLIC	SONOMA	BU	1	2,707	NONE	NO		50	
LIVERMORE MUNICIPAL	PUBLIC	ALAMEDA	TRANSPORT	2	4,005	PRECISION	YES	OPS	510	
MOFFETT NAS	MILITARY	SANTA CLARA	MILITARY	2	9,200	PRECISION	YES	OPS	2,263	
NAPA COUNTY	PUBLIC	NAPA	GU	3	5,931	NON-PRECISION	YES	OPS	735	
NUT TREE	PUBLIC	SOLANO	BU	1	3,818	NON-PRECISION	NO	OPS	227	
OAKLAND (N. FIELD)	PUBLIC	ALAMEDA	TRANSPORT	3	6,211	PRECISION	YES	OPS	980	
PALO ALTO	PUBLIC	SANTA CLARA	BU	1	2,500	NONE	YES	OPS	182	
PARRETT FIELD	PRIVATE	NAPA	BU	1	3,217	NONE	NO		60	
PETALUMA MUNICIPAL	PUBLIC	SONOMA	GU	1	3,600	NON-PRECISION	NO	OPS	220	
REID-HILLVIEW	PUBLIC	SANTA CLARA	BU	2	3,100	NON-PRECISION	YES	OPS	179	
RIO VISTA MUNICIPAL	PUBLIC	SOLANO	BU	2	3,060	NON-PRECISION	NO		141	
SAN CARLOS	PUBLIC	SAN MATEO	BU	1	2,600	NONE	YES		110	
SANTA ROSA AIR CENTER	PRIVATE	SONOMA	GU	1	7,000	PRECISION	NO		500	
SONOMA SKY PARK	PRIVATE	SONOMA	BU	1	2,500	NONE	NO		27	
SONOMA VALLEY	PRIVATE	SONOMA	BU	2	2,700	NONE	NO		79	
SOUTH COUNTY	PUBLIC	SANTA CLARA	BU	1	3,100	NONE	NO		179	
TRAVIS AFB	MILITARY	SOLANO	MILITARY	2	11,000	PRECISION	YES			
GA SUB-TOTAL									9,344	0
SYSTEM GRAND TOTAL									18,782	23,888

MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE -- PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	SGL ENGINE PISTON EXISTING BASED AIRCRAFT	MULT-ENGN PISTON EXISTING BASED AIRCRAFT	JET EXISTING BASED AIRCRAFT	ROTOR-CRAFT EXISTING BASED AIRCRAFT	OTHER EXISTING BASED AIRCRAFT	TOTAL EXISTING BASED AIRCRAFT	BASED AIRCRAFT CAPACITY	PERCENT OF CAPACITY USED
BUCHANAN FIELD	510	103	12	9	1	635	729	87.1%
OAKLAND (S. FIELD)	0	0	0	0	0	0	0	0.0%
SAN FRANCISCO INT'L	8	15	6	0	0	29	46	63.0%
SAN JOSE INT'L	490	160	18	12	0	680	670	101.5%
SONOMA COUNTY	355	90	5	2	2	454	667	68.1%
COMMERCIAL SUB-TOTAL	1363	368	41	23	3	1,798	2,112	85.1%
GA/MILITARY AIRPORTS								
ALAMEDA NAS	0	5	39	12	0	56		
BYRON	55	1	0	0	33	89	77	115.6%
CLOVERDALE MUNICIPAL	18	0	0	0	0	18	24	75.0%
GNOSS FIELD	269	35	1	3	0	308	317	97.2%
HALF MOON BAY	88	2	0	0	0	90	159	56.8%
HAMILTON FIELD	0	0	0	0	0	0		
HAYWARD AIR TERMINAL	540	114	6	6	0	666	521	127.8%
HEALDSBURG MUNICIPAL	56	2	0	0	0	58	80	72.5%
LIVERMORE MUNICIPAL	521	53	3	2	1	580	773	75.0%
MOFFETT NAS	0	18	80	16	7	121		
NAPA COUNTY	198	23	0	2	0	223	485	46.0%
NUT TREE	172	20	0	1	0	193	186	103.8%
OAKLAND (N. FIELD)	280	90	34	25	0	409	641	63.8%
PALO ALTO	519	35	0	1	0	555	629	88.2%
PARRETT FIELD	41	4	0	0	0	45	76	59.2%
PETALUMA MUNICIPAL	150	5	0	1	0	156	200	78.0%
REID-HILLVIEW	571	64	0	2	0	637	806	79.0%
RIO VISTA MUNICIPAL	49	4	0	1	0	54	70	77.1%
SAN CARLOS	414	81	0	0	0	495	546	90.7%
SANTA ROSA AIR CENTER	47	47	6	0	0	100	261	38.3%
SONOMA SKY PARK	40	4	0	0	0	44	49	89.8%
SONOMA VALLEY	175	6	0	1	1	183	140	130.7%
SOUTH COUNTY	88	7	0	0	0	95	144	66.0%
TRAVIS AFB						0		
GA SUB-TOTAL	4312	624	169	73	42	5220	6260	83.4%
SYSTEM GRAND TOTAL	5675	992	210	96	45	7,018	8,372	83.8%

SOURCE:
FAA 5010 Forms; CALTRANS

MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE -- PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	ANNUAL ENPLANED PAX a	ANNUAL AIR CARRIER OPS b	ANNUAL AIR CARRIER OPS CAPACITY	% ANNUAL AIR CARRIER CAPACITY USED	ANNUAL COMM./A.T. OPS c	ANNUAL G.A./MIL. OPS d	ANNUAL CARGO OPS e	TOTAL ANNUAL OPS	ANNUAL SERVICE VOLUME	RATIO OF TOTAL ANNUAL OPS TO A.S.V.
BUCHANAN FIELD	50,000	1,285			13,958	289,825	0	304,868	355,000	85.9%
OAKLAND (S. FIELD)	2,742,211	90,746			30,410	0	12,000	121,156	147,870	81.9%
SAN FRANCISCO INT'L	15,177,669	318,658			78,866	32,729	736	430,253	500,000	86.1%
SAN JOSE INT'L	3,140,000	95,778			48,550	199,672	3,862	344,000	355,000	96.9%
SONOMA COUNTY	65,765	439			10,593	158,374	0	169,406	295,000	57.4%
COMMERCIAL SUB-TOTAL	21,175,645	506,906			182,377	680,400	16,598	1,369,683	1,652,870	82.9%
GA/MILITARY AIRPORTS										
ALAMEDA NAS								0		
BYRON						9,000		9,000	230,000	3.9%
CLOVERDALE MUNICIPAL						20,000		20,000	230,000	8.7%
GNOSS FIELD						150,000		150,000	230,000	65.2%
HALF MOON BAY						70,000		70,000	260,000	26.9%
HAMILTON FIELD								0		
HAYWARD AIR TERMINAL						254,669		254,669	490,000	52.0%
HEALDSBURG MUNICIPAL						31,500		31,500	200,000	15.8%
LIVERMORE MUNICIPAL						230,000		230,000	255,000	90.2%
MOFFETT NAS								0		
NAPA COUNTY						172,000		172,000	360,000	47.8%
NUT TREE						144,000		144,000	250,000	57.6%
OAKLAND (N. FIELD)					23,493	257,720		281,213	352,130	79.9%
PALO ALTO						215,584		151,000	280,000	53.9%
PARRETT FIELD						12,000		12,000	230,000	5.2%
PETALUMA MUNICIPAL						65,000		65,000	230,000	28.3%
REID-HILLVIEW						196,568		196,568	400,000	49.1%
RIO VISTA MUNICIPAL						17,050		17,050	230,000	7.4%
SAN CARLOS						190,660		190,660	280,000	68.1%
SANTA ROSA AIR CENTER						30,000		30,000	230,000	13.0%
SONOMA SKY PARK						12,000		12,000	230,000	5.2%
SONOMA VALLEY						50,500		50,500	200,000	25.3%
SOUTH COUNTY						120,000		120,000	230,000	52.2%
TRAVIS AFB										
GA SUB-TOTAL	0				23,493	2,260,251	0	2,219,160	5,627,130	39.4%
SYSTEM GRAND TOTAL	21,175,645	506,906			205,870	2,940,651	16,598	3,588,843	7,280,000	49.3%

SOURCE:

a. Airport Traffic Records, 1990; MTC Airport Activity and Noise Trends, October, 1990

b., c., d. Airport Traffic Records, 1990; CALTRANS CASP Inventory, October, 1990

e. Individual airports

MTC REGIONAL AIRPORT SYSTEM PLAN UPDATE – PUBLIC USE AIRPORTS INVENTORY

MAJOR COMMERCIAL SERVICE AIRPORTS	PEAK HOUR OPS VFR f	PEAK HOUR OPS IFR g	TOTAL PEAK HOUR CAPACITY VFR	% OF PEAK HOUR CAPACITY USED VFR	TOTAL PEAK HOUR CAPACITY IFR	% OF PEAK HOUR CAPACITY USED IFR	ANNUAL AIR CARGO (TONS) h
BUCHANAN FIELD							180
OAKLAND (S. FIELD)			54	0.0%	48	0%	234,506
SAN FRANCISCO INT'L	115	97	103	111.7%	53	183%	624,110
SAN JOSE INT'L	113	91	150	75.3%	40	228%	59,196
SONOMA COUNTY							0
COMMERCIAL SUB-TOTAL		188	307	61.2%	141	133%	917,992
GA/MILITARY AIRPORTS							
ALAMEDA NAS							
BYRON							
CLOVERDALE MUNICIPAL							
GNOSS FIELD							
HALF MOON BAY							
HAMILTON FIELD							
HAYWARD AIR TERMINAL							
HEALDSBURG MUNICIPAL							
LIVERMORE MUNICIPAL							
MOFFETT NAS							
NAPA COUNTY							
NUT TREE							
OAKLAND (N. FIELD)							
PALO ALTO							
PARRETT FIELD							
PETALUMA MUNICIPAL							
REID-HILLVIEW							
RIO VISTA MUNICIPAL							
SAN CARLOS							
SANTA ROSA AIR CENTER							
SONOMA SKY PARK							
SONOMA VALLEY							
SOUTH COUNTY							
TRAVIS AFB							
GA SUB-TOTAL							0
SYSTEM GRAND TOTAL		188	307	61.2%	141	0.4%	917,992

SOURCE:

f., g. Individual Airports; Airport Master Plans

h. AOCI Traffic Report, Calendar Year 1990

Chapter VII

Airport System Alternatives Definition

Introduction

The objective of the definition of regional airport system alternatives is not only to identify the range of policy choices being faced by the region, but also to provide a basis for evaluating their feasibility as well as their possible consequences. The set of alternatives should offer a range of visions of the future, defined in sufficient detail to provide a basis for comparing them, choosing between them, and identifying the actions needed to implement them. While these alternatives must be founded in what is technically possible, they should not be unduly constrained by existing political or institutional agendas, for to accept such constraints may result in foregoing the best long-term solution in the interests of short-term expediency. Rather, such constraints should be recognized in the way the alternatives are defined and evaluated. The evaluation process should identify implementation pathways which could actually eliminate current constraints by building political constituencies for institutional change, where such change is needed.

Central to this approach is the requirement to quantitatively evaluate the alternatives, in order to provide a basis for choosing between them. This evaluation must address all those issues of concern to the broad array of interests in the process. For this to be possible, and for the evaluation to produce credible results, the alternatives must be defined in sufficient detail, both in terms of their specific elements as well as the actions that must be taken to implement them.

The Apogee Study

A previous study by Apogee Research, Inc., included extensive focus group discussions with a broad range of airport users, operators, and the general public. On the basis of these discussions, six strategic policy approaches were developed, as follows (Apogee Research, Regional Airport System Plan Update: Summary of Findings and Policy Alternatives, December 7, 1990):

Plan One: No New Action

This policy envisages a continuation of the current status quo, with no significant new capacity and steadily increasing congestion everywhere. Market forces would tend to shift traffic growth from SFO to OAK and SJC.

Plan Two: Centralize Aviation Activity

This policy encourages future growth to be concentrated at SFO, in order to minimize the spread of adverse impacts. Resources would be directed at improving ground access to SFO, and additional Bay fill to increase capacity and reduce noise impacts would be considered.

Plan Three: Limited Decentralization

This policy encourages growth at OAK and SJC by improving ground access to those airports. Capacity increases at SFO would be limited to increased operational efficiency, improved ATC technology, and the use of larger aircraft.

Plan Four: Greater Decentralization

This policy seeks to expand capacity at other airports in the region, including new airport sites well outside the urban area, and limits the growth at SFO, OAK, and SJC.

Plan Five: Alternatives to Aviation

This policy encourages the development of high-speed rail services or other modes of transportation as a way to reduce the need for expanding airport capacity. Resources would be directed at developing intermodal links, with growth of the existing airports limited by noise restrictions and opposition to further Bay fill.

Plan Six: Ground Transportation Focus

This policy would emphasize improving ground access to all airports and allow the growth of each airport to be determined by market forces.

These policy alternatives can be thought of as providing a strategic perspective on the development of the regional airport system. While they do not identify the specific projects and implementation actions that are necessary for a quantitative evaluation of alternatives, they articulate broad goals for the future state of the airport system. Those early alternatives were then translated into specific, implementation-oriented alternative plans, as presented below.

These policy alternatives are intended to represent the interests of different interest groups in the regional airport planning process, as expressed through the focus groups. The alternatives were prepared to encompass a wide enough range of options to ensure that each constituency should feel that at least some of the alternatives (or elements thereof) are responsive to their concerns.

Air Carrier and General Aviation Airports

The regional airport system is not a homogeneous set of facilities, but rather consists of two broad categories of airport that serve two very different types of traffic. Of the some thirty airports in the region, a small number, currently five, serve the needs of the commercial air carriers. The largest, San Francisco International, handles more air carrier traffic than all the others combined. While the three largest air carrier airports also serve a varying amount of general aviation traffic, the greater number of airports serve only general aviation traffic.

Because of the widely differing requirements of air carrier and general aviation activity, and the implications for airport development, it is useful to consider the two types of airport separately when defining alternatives for a regional system. Thus the complete range of system alternatives will consist of one set of Air Carrier Airport System

Alternatives and another set of General Aviation Airport System Alternatives. Of course, these two sets of alternatives interact in some respects, and some air carrier airport system alternatives may be inconsistent with some general aviation airport system alternatives. However, by evaluating each set in terms of how well the alternatives perform for their respective market, interaction problems can be addressed in selecting between the alternatives in each set, once they have been evaluated.

The following two sections describe the air carrier airport system alternatives and the general aviation airport system alternatives. Each alternative description includes a summary statement, a list of its major elements, the actions needed to implement the alternative, and a list of implications. The implications are explained at the end of the alternative descriptions.

AIR CARRIER SYSTEM ALTERNATIVES

1. No New Action

Description

This alternative provides the baseline for comparison of the other air carrier system alternatives. It is based on the assumption that no new major additional airside, landside, ground access, or public transportation capacity is built at the five existing air carrier airports. It also assumes that no new major operational actions or other airport system management actions are taken, either by the airports, the FAA, the airlines, or other parties. The existing five air carrier airports would continue to be operated and maintained, with annual funding provided to maintain the existing airside and landside facilities, but with no enhancement of capacity. Growth in airport activity (passenger, GA, and cargo) would be constrained by current airspace and the capacity of existing facilities (including approved projects)

Alternative 1 does assume that existing construction projects which are contained in existing approved airport master plans, and which have received environmental approvals, will be built. These include the following projects:

1. Runway Extension at San Jose
2. Passenger Terminal Expansion at San Francisco
3. Minor Bag Claim, Ticketing, Passenger Lobby, and International Arrival Facility Projects at Oakland

The purpose of including the no new action alternative is to evaluate what would happen if demand continues but no additional capacity is provided, and to compare this no action scenario with alternatives which do increase capacity. As this alternative would include no actions to affect the air travel market or the existing distribution of supply or demand, the airlines could take unilateral steps under this alternative to balance supply and demand at the five air carrier airports. These steps could include adjusting their schedules, fleet mix changes, and shifting their service between the airports. For comparison of the air carrier system alternatives, however, these airlines actions are not considered in the no new action alternative.

Elements

A. Only currently approved projects would be developed

B. No other new runway capacity projects

C. No other new terminal capacity or other support facility projects

D. No other new ground access or public transit improvement projects designed to serve the airports

E. No regional actions to encourage significant changes in airline schedules, fleet mix, or distribution of traffic among airports

Actions Needed to Implement

A. Design and construction of currently approved projects

B. Annual capital improvement programming for maintenance of existing facilities

C. Annual renewal of airport operating budgets

Implications

A. Runway/airspace congestion and delay

B. Airport ground access constraints

C. Air fares (supply vs demand)

D. Environmental impacts

E. Airline competition

F. Safety

G. Passenger convenience

2. Airport System Management (ASM)

Description

The ASM alternative would seek to maximize the effectiveness of the existing airport system without major new construction by using a number of system management strategies aimed at matching supply and demand and making optimum use of existing facility capacity. This alternative would depend on increased cooperation between all participating airports and airlines. This alternative would rely on measures to increase groundside access and public transit to airports to take full advantage of existing runway and terminal capacity.

In order to relieve congestion, this alternative would also include encouragement of passenger traffic dispersal from the three major air carrier airports to Concord and Sonoma County, and possibly other airports in the region, within their existing capacity to accommodate it. Given the current distribution of airport capacity and demand, this alternative would inevitably result in some redistribution of demand among airports. This could require a variety of political and physical development decisions at a number of levels of government. This alternative could possibly result in greater emergence of individual airport roles among the three major air carrier airports. One example could be for each of the three largest air carrier airports to focus on the following roles:

SFO: International and Tourist Traffic
SJC: California/West Coast Corridor Traffic
OAK: East-West Domestic Traffic

Another possible result of this alternative could be reduced facility duplication consistent with these emerging airport roles (eg. centralization of certain functions, such as F.I.S., cargo, etc., at one airport). Present examples of this trend are the concentration of international facilities at SFO and overnight air cargo activity at OAK.

Elements

A. FAA Measures to Enhance Capacity, including:

* Revised standards for converging runway operations
* Reduced in-trail separation
* Airspace improvements
* Improved approach and departure procedures
* Improved navigation/electronics

B. Fleet Mix Changes

* Airline shifts to larger aircraft during peak periods, on heavily travelled routes, at the most congested airports, etc.
* Eliminate turbo-prop aircraft from the air carrier runways or congested airports

C. Schedule changes/congestion pricing

* Shifts of traffic away from peak periods

E. Construction of off-airport terminals and improved bus service

F. Improved rail links (BART) to airports

G. Improved links between airports, such as ferry service between OAK and SFO

H. Encourage GA activity to relocate away from major air carrier airports

I. Joint use of military airfields (such as Travis AFB)

Actions Needed to Implement

A. FAA completion of research and development, and ATC implementation of new standards and operational procedures

B. Airline implementation of training and equipment programs to support new standards and procedures

C. Development of regional capacity allocation program

D. Development of regional program of pricing, noise budgets, or other incentives to reduce peak period demand

E. Coordinated airport and airline marketing of specialized roles of each airport

F. Development of regional airport ground access improvement program with appropriate funding and regulatory/operating authority

G. Develop pricing, leasing, and other mechanisms to encourage GA to relocate from congested air carrier airports to GA relievers

H. Provide funding for improvements at GA airports to accommodate relocated GA from major air carrier airports

I. Develop minimal passenger processing facilities at joint use airports

Implications

A. Timing of FAA capacity enhancement measures

B. Airport cooperation

C. Airline cooperation

D. Air fares (supply vs demand)

E. Transit improvements to airports

F. Joint use agreements with military

G. Safety (airport and airspace capacity)

H. Passenger convenience

3. Master Plans

Description

This alternative would meet identified future demand by expanding airport system capacity as proposed in the most recent individual airport master plan concepts. Capacity improvements to the airside, landside, ground transportation, and public transit systems would be built consistent with those updated master plans. According to those currently proposed master plans (OAK and SJC) regional air passenger market shares would shift as follows:

Potential Shift in Regional Passenger Market Share

Airport	1990 Market Share	2007 Market Share
SFO	72%	61%
OAK	13%	16%
SJC	15%	23%

One function of this alternative will be to evaluate whether the individual airport master plans will efficiently accommodate regional air travel demand from a capacity and environmental perspective. This alternative will examine whether the updated master plans are based on consistent assumptions, and, if they are not, will outline actions needed to achieve a regional balance of demand and capacity.

Elements

A. Increased Runway Capacity

* New parallel runway at OAK

B. Increased Terminal Capacity

* New international terminal at SFO
* Major terminal development at OAK
* Development of Terminals B and C at SJC

C. Increased Landside Support Facility Capacity

* Auto Parking
* Terminal curbs and roadways
* Airline support facilities
* Airport support facilities
* Fuel facilities

D. Ground Access/Public Transportation Improvements at SFO, OAK, SJC

* Improvements to freeways, interchanges, and other surface streets serving airports
* BART extension to SFO
* Future BART connection to OAK

E. Reduced GA use of air carrier airports:

* Reduced GA operations at OAK
* Reduced GA operations and based aircraft at SJC

Actions Needed to Implement

A. Completion of master plan approval process (including FAA)

B. Environmental approval/mitigation

C. Airspace studies

D. Funding process

E. Design and construction

F. Public Acceptance

Implications

A. Timing and funding of improvements

B. Airspace capacity

C. Runway capacity/delay

D. Funding of transit improvements

E. Environmental impacts/public concensus

F. Impacts on General Aviation (primarily SJC and OAK)

4. Airport System Optimization

Description

This alternative would meet forecast regional passenger demand by construction of significant new capacity, but would depart from alternative 3 by seeking to optimize the performance of the system as a whole. This alternative would include possible redistribution of regional passenger traffic to optimize the existing airport system (as well as develop new ones) and better distribute supply according to the regional distribution of demand. Among the factors used to achieve optimization of the airport system are:

* Passenger convenience
* Airspace utilization
* Airport ground access capacity
* Environmental impacts
* System cost

There are two sub-alternatives for accomplishing this: (1) major regional airport growth would be either focussed (providing major capacity increases at SFO, OAK and SJC); or (2) future capacity enhancement would be decentralized (providing for growth at a fourth major air carrier airport in the region). The focussed concept would add significant capacity at the existing airports by construction of new outboard runways into the bay at SFO and/or OAK, and a new parallel runway at SJC. This alternative could result in the following redistribution of regional passenger market share: SFO: 50% OAK: 25% SJC: 25%. The decentralized concept would include construction of a fourth major air carrier airport at either Travis AFB, another existing airport, or at a new site. This option would also result in a major redistribution of regional passenger market share. Included as a possible element of either sub-alternative would be the development of additional commuter airline service at Concord, Sonoma County, and other outlying GA airports.

Elements

A. Capacity increases at SFO, SJC, OAK, :

* New outboard runway at SFO
* New outboard runway at OAK
* New parallel runway at SJC

B. Develop fourth major air carrier airport:

* Travis AFB
* Other existing airport
* New site

C. Develop new/expanded airline service at other airports (Concord, Sonoma County, Livermore, Napa, etc.)

D. Terminal expansions to support runway capacity growth

E. Ground access/public transit improvements to support airport growth

F. Airspace/procedures improvements to support airport growth

Actions Needed to Implement

A. SFO/SJC/OAK airport runway capacity expansion:

* Airspace studies/procedural changes
* Environmental approvals (including required mitigation)
* Property acquisition (where necessary)
* Funding process
* Design and construction

B. Terminal capacity expansion:

* Environmental approvals/mitigation
* Funding process
* Design and construction

C. Ground access/public transit development:

* Financial feasibility studies and corridor/engineering studies
* Environmental approvals/mitigation
* Funding process
* Design and construction

D. Develop existing airport as fourth air carrier airport:

* Develop or expand joint use agreement (if military)
* Airspace studies/procedural changes
* Property acquisition/land banking (where necessary)
* Environmental approvals/mitigation
* Funding process
* Design and construction
* Determine operating entity
* Develop noise/land use compatibility/height hazard plans

E. Develop new airport:

* Site selection process
* Airspace studies/procedural changes
* Property acquisition/land banking
* Environmental review and approvals process (including mitigation)
* Funding process
* Design and construction
* Determine/establish operating entity
* Develop noise/land use compatibility/height hazard plans

Implications

A. Timing of improvements

B. Funding sources

C. Operating agencies (new airports)

D. Environmental impacts

5. New Technology

Description

This alternative would focus on new air and rail technology alternatives to supplement the existing airport system. The alternatives include both aviation and non-aviation technology.

Elements

A. Construction of high-speed ground transportation (primarily forintra-California Corridor Traffic), such as conventional rail, MAGLEV, automated highway, or other technology. This element would act to reduce demand for air travel by diverting air passengers to the new ground transportation mode.

B. Application of Tiltrotor aircraft technology

This element would also reduce conventional air travel demand by diverting air passsenger traffic away from traditional air transport. This element is primarily seen as an alternative for the shorter haul air traffic routes, such as those under 500 miles. This element could lso require facility improvements at reliever airports served by tiltrotor aircraft.

Actions Needed to Implement

A. Continuation of R&D efforts for both tiltrotor and high speed ground transportation

B. Development of commercial application of the technology

C. Airspace studies/procedural changes (tiltrotor element)

D. Creation of appropriate operating agency

E. Corridor/engineering studies (ground transportation element)

F. Financial feasibility studies

G. Property assembly/acquisition (ground transportation element)

H. Environmental approvals/mitigation

I. Identify facility requirements to serve tiltrotor activity

J. Funding process

K. Design and construction

Implications

A. Potential markets

B. Practical application

C. Capacity and delay

D. Timing of new technology

E. Environmental impacts

F. Airspace procedures

G. Financing

GENERAL AVIATION SYSTEM ALTERNATIVES

1. No Action

Description

The No Action GA alternative provides the baseline for comparison of the others, and would consist of no increase in capacity at any of the General Aviation airports. In addition, no regional action would be taken to prevent the potential closure of existing GA airports, such as Reid-Hillview. Total regional airport system capacity would be limited by existing airport facilities at each airport, and possibly reduced due to GA airport closures. The existing general aviation airports would, however, be maintained to provide safe, functional facilities.

Elements

A. Preserve existing airport facilities

B. Protect airports from encroachment by adjoining community:

* Maintain/enhance land use compatibility
* Maintain height hazard/safety zoning and planning

Actions Needed to Implement

A. Provide adequate funding for operation and maintenance of the airports in the system

B. Maintain and regularly update noise/land use compatibility and height hazard/safety plans

Implications

A. Capacity and delay

B. Safety

C. Financing

D. Noise/land use compatibility

2. General Aviation Airport Master Plans

Description

This alternative would meet identified future demand by developing the general aviation airport system as proposed within the current individual airport master plans. This alternative would provide a full range of GA support services, and would have all necessary navigational aids and instrumentation to provide for the pilot training needs of the region. These airports would provide some excess facility and service capacity to replace those lost due to the anticipated displacement of general aviation activities at the large air carrier airports such as SFO, OAK, and SJC. These airports would also provide for displaced GA activities in the event that Reid-Hillview or other airports were to close. In addition, this alternative could allow for selected GA airports to be used to meet demand for decentralized commuter activity close to users homes.

Elements

A. Develop facilities at selected airports to support these activities

* Runways/taxiways
* Apron/aircraft parking/hangars
* Instrumentation/navigation
* Lighting, FBO facilities, etc

B. Develop facilities for displaced recreational GA at selected airports

Actions Needed to Implement

A. Development of mechanism to allocate capacity expansion among airports and identify required facilities at each airport. Identify potential future losses in GA capacity

B. Airspace studies/procedural changes

C. Environmental approvals/mitigation

D. Funding process

E. Develop/implement noise/land use compatibility/height hazard plans

F. Project engineering/design

* Runway construction
* Support facility construction
* Ground access improvements

Implications

A. Funding of improvements

B. Airport/community compatibility

C. Environmental impacts

3. General Aviation Airport System Optimization

Description

This alternative would expand certain existing GA airports and develop new GA airports on the periphery of the urban area in locations where land use compatibility and aviation safety problems can be avoided or minimized. Because remote sites would be preferable, this alternative could also involve improvements to local streets and highways to provide ground access to the new airports. Supporting infrastructure, including sewer, water, power, aviation fuel, etc., would also need to be provided. These new airports could also support limited passenger service by commuter airlines.

By locating new GA capacity at the edge of the urban area where community impacts can be minimized, this alternative could provide for the relocation of existing GA activity from close-in urban airports which are either threatened due to existing impacts on the surrounding urban community or pressured by expanding air carrier passenger and cargo activity. An example of this concept would be accelerated development of the improvements planned at Byron airport.

Elements

A. Select sites and develop new GA airports in compatible locations

B. Provide sufficient facility capacity for future GA demand as well as GA displaced from existing close-in airports (OAK, SJC, Reid-Hillview)

C. Develop new facilities at specialized airports for training/business aviation activities

D. Develop facilities to relieve air carrier airports

E. Acquire sufficient property and ensure land use compatibility to protect airport from possible future urban encroachment

F. Restrict further investment at airports with little likelihood of achieving community acceptance

Actions Needed to Implement

A. Site selection studies

B. Establish development/operating entity

C. Develop noise/land use compatibility/height hazard plans

D. Land assembly/acquisition

E. Environmental approvals/mitigation

F. Funding process

G. Design/construction

H. Develop utility infrastructure

I. Develop/improve ground access links

Implications

A. Timing of development

B. Funding of development

C. Airport operating authority

D. Environmental impact

E. Compatibility/encroachment protection

Description of Implications

Included with each airport system alternative as described above is a list of implications. The list identifies major items which could be affected by the alternative. For example, a no action alternative could lead to increased congestion and delay, and cause passenger inconvenience. Another alternative which provided increased capacity may improve passenger convenience, but could cause impacts on the natural and human environment. Identification of major implications at this stage of the planning process was done to assist in the development of the alternative eveluation methodology.

Runway/airspace congestion and delay

A major consideration in evaluating the airport system alternatives is to how well each alternative meets existing and future demand. Alternatives which do not provide capacity improvements sufficient to meet forecast levels of demand may result in significant congestion and delay on runways, taxiways, and apron areas, in terminal facilities, on the landside of the terminals, or elsewhere. Alternatives which do not account for the structure and capacity of the regional airspace may create airspace conflicts, with related safety and delay implications. These implications are discussed separately below.

Airport ground access constraints

Ground access to the region's airports is becomming an increasingly complex issue. Future increases in air travel demand at the five air carrier airports will increase the already heavy strain on the region's existing ground transportation system. At certain locations near the largest airports peak hour surface access congestion and delay creates significant inconvenience to air passengers. Growing uncertainty about how long it will take to reach the airport requires passengers to plan greater and greater lead time before flight departures. The growing problem with airport ground access results in passenger inconvenience, decreased productivity, inefficient use of the airport system, and regional environmental impacts. Some of these related implications are also discussed below.

Environmental Impacts

Each of the airport system alternatives will have some impact on the environment. Alternatives which provide facilities to accommodate airport system growth will have direct on-site impacts, growth-inducing impacts on the region, and impacts such as air quality and noise from the operation of a larger and busier system. Those which redistribute air traffic among the region's airports may reduce noise in one area but increase it in another. The severity of this noise impact will be related to factors such as the type, density, and location of land uses near the airports.

Those alternatives which do not provide for growth, or which provide insufficient capacity to meet future demand, may cause indirect environmental impacts resulting from airport congestion and delay or increased use of alternative forms of travel such as highways.

Air Fares (supply vs demand)/Airline competition

One of the potential implications of differing approaches to meeting future demand may be the effect on air fares and airline competition. Given a free market, if demand far exceeds supply the price will rise until a balance is achieved between supply, demand, and price. Lack of sufficient terminal space can effectively block out new carriers, reducing competition among airlines. One of the regional implications of the system plan is therefore related to the potential effect on competition and ticket prices, and the related issue of equal access to the nation's air transportation system. Alternatives which do not provide for any increase in air traffic demand could cause regional increases in ticket prices and result in a decreasing ability of low and moderate income persons to access the air transportation system. Lack of airline competition could also affect level of service and ticket prices.

Safety

One of the implications of regional airport system development decisions will relate to aircraft safety, both on the ground and in the air. Growing public concern over safety is in part related to increasing congestion at airports and in the airspace around them. As congestion increases the potential for pilot, air traffic controller, air navigation, communication, and other system error increases. With this comes a growing potential for accidents. Regional airport system alternatives that do not effectively address existing and future airport or airspace congestion may contribute to this safety concern.

Timing of improvements or other actions

Timing is listed as an important implication under many of the airport system alternatives. This factor could be significant as it relates to the ability of MTC and the region to implement selected alternatives and actions. This issue relates to the length of time it may take to complete site selection processes, environmental approvals, construction projects, FAA research activities and other actions, development of new technologies, creation of necessary organizational structures, and development of the political will of the region to take action. For example, selection of a site and construction of a new air carrier airport may ease the region's congestion, but could take 10 years or more to complete. If this alternative were selected in the plan, it may be also necessary to include interim measures to meet growing demand until such time as the new airport can be built and put into service. Timing is therefore an important implication of choosing this alternative.

FAA capacity enhancement measures and new technology may also be elements of the regional plan, but there may be considerable time before they are implementable. Again, the timing of these elements of the regional airport system plan is a critical aspect in eveluating how well they will serve the region.

Airport/airline cooperation

Several elements of the alternatives will require the cooperation of both airports and airlines for their implementation. Examples include decisions to shift traffic between airports, shifts in aircraft fleet mix, and changes in airline schedules. As such elements are further defined and evaluated in the planning process this factor needs to be recognized as beyond the direct control of MTC.

Joint use agrements with the military

Civil use of military airport facilities will require the development and/or enhancement of joint use agreements with the appropriate military sponsors and/or participation in the FAA's Military Airports Program (MAP). As an example, Travis Air Force Base currently has a civil/military joint use agreement which allows up to 12 daily operations with civil aircraft. Expansion of this agreement to allow significantly more flights would be necessary in order to develop Travis as a significant passenger service facility. This would also be the case for other existing military facilities. In addition, passenger processing facilities would need to be built or improved. The Military Airports Program is one potential source of funds for such passenger improvements.

Public transportation improvements to airports

As mentioned above in relation to ground access, airport expansion and growth in passenger and cargo traffic will put additional pressure on the region's surface transportation system. Those alternatives that provide for airport expansion in areas where existing ground transportation systems are near or at capacity must also consider the need for public transportation system improvements to supplement or provide alternatives to traditional private vehicle ground access systems serving the airports. Specific examples which are already recognized and under study are a potential BART extension to SFO, future BART connection to OAK, and a future connection between SJC and the San Jose light rail line.

Funding

Most elements of every alternative will have some cost, including airport improvements, airspace changes, airline actions, ground access improvements, and public transportation projects. The funding implications of specific elements relate to the overall cost and the timing and availability of funds.

Impacts on general aviation

A number of actions at the five air carrier airports could have significant impacts on the continued existance and viability of general aviation at those airports. Significant expansion of passenger and cargo activities will likely increase the existing pressure for GA activities to relocate. The fate of general aviation at the air carrier airports therefore raises a related issue of how to address GA which is displaced. Let 'em eat jet blast!

Operating agencies

Where joint use facilities or new airports are proposed operating agencies would need to be designated or established.

Potential markets/practical application

This applies primarily to the use of new technology. The effectiveness of new technology to address the region's air travel demand will be affected by the potential market for and the degree and timing of practical application of such technology. For example, the effective use of conventional high speed rail within the California corridor as an alternative to air travel will be constrained by factors as:

1. The portion of the total market which can be diverted from air to rail.

2. The degree and timing of actual application of the technology.

3. The comparative cost, comfort, speed, and safety of rail travel as related to air travel.

Noise/land use compatibility/encroachment protection

A critical issue in evaluating alternatives for the region will be how well noise and land use compatibility between airports and surrounding communities can be achieved or maintained. It may be possible to accommodate significant increases in demand at a particular airport but only at great expense in terms of impacts to adjoining communities. Thus there can be major trade-offs between efficiently meeting future demand and minimizing human impacts.

A related issue is that of encroachment. How well an airport or system of airports functions can be significantly affected by non-airport actions. Urban development near airports can create operational, environmental, and development limitations and hamper the airports' ability to operate efficiently and safely, and to meet demand. If public funds are to be effectively invested in airport facilities the public must provide for the protection of that public investment from encroachment by non compatible land uses. Both the noise and encroachment issues can be addressed in part by noise, height hazard, and safety planning and zoning.

Passenger convenience

Passenger convenience relates to the ease of movement to and through a passenger terminal facility. Factors include ease of access to the airport, parking cost and location in relation to the terminal, passenger walking distances, and relative amount of terminal congestion and delay. Passenger convenience is an important measure in evaluating the performance of passenger processing facilities. In addition to selection of airlines, flights, and schedules, overall passenger convenience is an important factor in a passenger's selection of an airport in a multiple airport system.

HIGH-SPEED RAIL ALTERNATIVE

SAN FRANCISCO-LOS ANGELES/SAN DIEGO

Market Size and Capture

SF-LA/SD market: 30% of total SF region air market
1990 Est. demand: 12.6 million passengers
2010 Est. demand: 26.7 million passengers

2010 market capture: 10% = 2.7 million
25% = 6.7 million
36% = 9.6 million

Alternative 1:

Trip length: 422 miles
Estimated speed: 125 MPH
Travel time: 5 hr.
Est. passengers: 3-3.8 million
(Source: Caltrans and Parsons, Brinkerhoff, 1990)

Alternative 2:

Trip length: 413 miles
Estimated speed: 185 MPH
Travel time: 3 hr. 15 min.
Est. passengers: 5.3-7.9 million
(Source: Caltrans and Parsons, Brinkerhoff, 1990)

OTHER MARKET SHARE PROJECTIONS

California-Nevada high-speed train: 25% by the year 2000
(Source: Canadian Institute of Guided Ground Transport using previous work by Barton-Aschman Associates, 1989)

Detroit-Chicago HSGT train: 65% by the year 2020
(Source: Argonne National Lab, 1989)

LA-San Francisco MAGLEV train: 38% by the year 2000
(through 2030)
(Source: U.S. Federal Railroad Administration, 1990)

EXISTING NEW YORK-WASHINGTON AMTRAK RAIL SERVICE

Trip length: 225 miles

Amtrak Metroliner

Maximum speed:	125 MPH
Travel time:	2 hr. 35 min.
Fare (one way):	$74
Air fare (oneway):	$73
Capacity (each way):	17 trains per weekday
	280 seats per train
	4,760 seats per day
	9,520 total seats per day
	2.5 million weekday seats per year
	3.5 million total seats per year

Regular Amtrak Service

Travel time:	3 hr. 10 min.
Fare (one way):	$59 ($83 round trip)
Air fare (one way):	$73
Capacity (each way):	15 trains per day
	280 seats per train
	4,200 seats per day
	8,400 total seats per day
	3.0 million total seats per year

1990 Market share: 36%

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Attachment C

ATTACHMENT C
WORK PROGRAM FOR THE AIRPORT MASTER PLAN AND NOISE PROGRAM SAN JOSE INTERNATIONAL AIRPORT

Memorandum from the Director of Aviation
to the Mayor and City Council
City of San Jose
June 6, 1991

D
REF
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attach. c

COUNCIL AGENDA: June 25, 1991
ITEM: 9.6

CITY OF SAN JOSE - MEMORANDUM

TO: Honorable Mayor and City Council FROM: Ralph G. Tonseth
Director of Aviation

SUBJECT: AIRPORT MASTER PLAN AND NOISE PROGRAM DATE: June 6, 1991

APPROVED DATE 6-20-91

COUNCIL DISTRICT: City-Wide

RECOMMENDATIONS

1. That Council approve the attached work program implementing the Council's May 21, 1991 action on the Airport Master Plan and Noise Program.

2. That Council approve Amendment No. 2 to the consultant contract agreement with TRA for the Airport Master Plan Update project extending the termination date to June 30, 1993 and modifying the scope of services and associated budget.

3. That Council approve Amendment No. 1 to the consultant contract agreement with David J. Powers & Associates for an Environmental Impact Report and Environmental Assessment for the Airport Runway Extension project modifying the scope of services and increase the associated budget by $24,925.

BACKGROUND

The Airport Master Plan Update project has been underway since November, 1988 under a Grant Agreement with the Federal Aviation Administration and with the assistance of the consulting firm of TRA. Since the completion of the draft Alternatives Analysis (Task 6) in December, the Master Plan Update project has essentially been on hold to allow for public review and City Council consideration of a recommended long range development plan. On May 21, 1991, the Council approved a set of recommendations to provide direction for the remainder of the project. Major approved items include:

- Direction to initiate preparation of an Environmental Impact Report (EIR) which fully evaluates Alternative 6 (the staff project case), an Alternative 8 (as submitted to the Council by the Citizens Against Airport Pollution), and an Alternative 9 (a new moderate growth alternative to be formulated). A recommended alternative will not be selected until completion of the environmental review process.

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- Direction to include in the EIR process the evaluation of a number of specific noise mitigation measures, and incorporating language making noise mitigation an explicit objective of the Master Plan, with analysis of a noise ordinance in the initial phase of the EIR.

- Creation of a Council-appointed task force to review regional general aviation issues and report to Council with recommendations in November, 1991.

- Direction to amend existing consultant agreements to immediately begin studies of the extension of Runway 12R/30L and to suspend studies of the extension of Runway 12L/30R and instead include this project as part of the Master Plan Update process.

- Direction to report to Council on a monthly basis, and to the Transportation and Development Committee on a regular basis, on the status of the Master Plan Update and Noise Mitigation Program.

This direction significantly impacts the previously approved project work program, budget, and schedule. In order to begin implementing Council direction, a comprehensive work program/schedule (exhibit attached) and two amended consultant contract agreements have been prepared for Council approval.

ANALYSIS

A list and summary of the major work program elements addressing all issues associated with the Airport Master Plan and Noise Program, generally corresponding to the attached exhibit, is presented below:

I. Airport Master Plan Update

A. Environmental Impact Report/Environmental Assessment (EIR/EA)

1. Consultant Selection

Given the increasing focus on environmental issues associated with Airport growth, staff determined in late 1990 that the project EIR/EA should be prepared by an environmental firm reporting directly to the City rather than by a subcontractor to the Master Plan Update consultant (TRA). The Airport and Planning Departments have jointly conducted a consultant selection process, a consultant has been tentatively selected, preparation of a detailed scope of services and budget will occur over the next month, and a contract agreement is anticipated to be

presented for Council action in August. (The recommended amendment to the TRA contract agreement includes deletion of the EIR/EA from its scope of services.)

2. Scoping and Evaluation of Alternatives

The EIR/EA will fully evaluate Master Plan Update Alternatives 6, 8, and 9. For new Alternative 9 (moderate growth), staff proposes to initially formulate the scenario with input from citizen groups and subsequent review by the Airport Master Plan Advisory Committee (AMPAC) along with any needed refinements to Alternatives 6 and 8 and a No Project Alternative. All alternatives will be presented at a formal EIR scoping hearing and subsequently presented to the Council for endorsement prior to initiating detailed environmental analysis. The attached work program reflects an optimistic completion of scoping by the end of 1991.

3. Evaluation of Mitigation Measures

As part of the EIR process, staff identified ten specific potential noise mitigation measures for evaluation: noise ordinance; triggers; accelerated Phase 2 aircraft phase-out; hush house; accelerated/improved land use mitigation measures; additional land use mitigation measures; alternative flight tracks and approach/departure procedures; improved noise monitoring and reporting; sound attenuation policy/ordinance for new development; and real estate disclosure policy/ordinance. Council subsequently directed that noise mitigation be an explicit objective of the Master Plan.

For the noise ordinance measure, which Council directed for the initial phase of the EIR, staff will coordinate with the City Attorney's Office. Analysis of forthcoming Federal regulations implementing the Airport Noise and Capacity Act of 1990 will feed into the evaluation.

For noise monitoring and reporting, staff has begun an investigation of an upgrade to the Airport's monitoring system. Staff is also developing a revised format and content for the monthly Airport Noise Reports and a new annual report as directed by Council.

In addition to evaluating noise mitigation measures, staff also intends to evaluate potential surface traffic mitigation measures as well.

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4. Completion/Certification

It is anticipated that the expanded EIR will take an additional 12-18 months to complete. Upon Planning Commission certification, expected in early 1993, selection of a preferred development alternative will be submitted for Council consideration.

B. Update of Analysis To Date

Given the expanded schedule for the Master Plan Update, staff and the project consultant will update all base year data from 1988 to 1990, and review all technical analyses (including demand forecasts) and revise as needed. Also, pursuant to Council direction, the Goal and Objectives task will be revised to add noise mitigation as a specific objective, and the Alternatives Analysis task will be supplemented with the addition of Alternatives 8 and 9. All revisions will be reviewed with AMPAC. As the existing contract agreement with the Master Plan Update consultant (TRA) terminates on June 30, 1991, Amendment No. 2 is needed to allow the consultant to continue its services to the City.

C. Economic Analysis

In conjunction with the environmental evaluation of Alternatives 6, 8, and 9, a consultant study of the economic impact of the various alternatives will be conducted. Staff will initiate the consultant selection process within the next month, with a contract agreement presented for Council action by October. One early product will be a comprehensive update to the City's 1986 Airport Economic Impact Study.

D. Remaining Master Plan Update Tasks

Upon selection of a preferred development alternative in early 1993 (following completion of the EIR), the project consultant will conduct the remaining Master Plan Update tasks, consisting of the Implementation Program, Airport Layout Plans, and final documentation. Review by AMPAC will be maintained throughout the program. It is anticipated that the final Master Plan Update will be presented for adoption by Summer 1993.

This proposed Master Plan Update schedule is optimistic and contingent upon successful discussion with Airport tenants (airlines, FBO's), other government agencies (FAA, City of Santa Clara), and community organizations (Chamber of Commerce, CAAP).

II. Master Plan Process Ordinance

Pursuant to Council direction, preparation of a City ordinance on amendments to the Airport Master Plan will be initiated by staff and the City Attorney's Office as part of the Master Plan Update's Implementation Program task. Adoption can occur as soon as possible, and must precede the adoption of the Master Plan.

III. General Aviation Task Force

Staff is currently preparing a minor consultant contract to facilitate Task Force meetings and discussions. The Task Force will initiate its activities upon completion of Council appointments and report to Council with recommendations in November, 1991.

IV. Runway 30L Extension

A. Design

The design studies for the Runway 30L Extension are currently being initiated by the Public Works Department utilizing the consultant (HNTB) already under contract to prepare the design for the extension of Runway 30R (suspended by Council on May 21, 1991). An amendment to the HNTB contract agreement will be presented to Council by Public Works in the Fall. Project design will be complete by January, 1992.

B. EIR/EA

The recommended amendment to the contract agreement with David J. Powers & Associates (previously preparing the EIR/EA for the Runway 30R extension) would allow the EIR/EA to be initiated. A second amendment will be brought forward to cover subsequent phases of EIR/EA preparation. Completion and Planning Commission certification is anticipated in December, 1991.

C. Project Construction

Once adequate environmental studies for Runway 30L have been performed and the EIR/EA has been accepted as complete, and project design is complete, the City can proceed to bid the project. This schedule anticipates that Public Works would conduct a bid and award process with Council action occurring in early 1992. Construction could then be anticipated to extend through mid-1993 under this schedule.

V. Airport Noise Program

A. Noise Monitoring System and Modified Noise Reports

Refer to item I-A-3 above. Revised monthly reports should begin in August 1991.

B. Analysis of Federal Noise Regulations

Refer to item I-A-3 above. Pending issuance of the Federal regulations this Summer, the analysis should be available in early Fall 1991.

C. Engine Run-up Operational Changes

Refer to item I-A-3 above. A report on the engine run-up issue should be available by September, 1991.

D. Good Neighbor Program and Stage 3 Airline Compliance

Staff activities on an airline "good neighbor" program and a Stage 3 aircraft compliance goal are currently being developed and should be available for review in August, 1991.

VI. General

A. Document for All Recommendations

Staff will prepare a file of information on the Airport Master Plan Update and Noise Program for public review at the City Clerk's Office. The file, which would include the Administration's reports to the Committee of the Whole and public hearings and related documents, will be available in July and include all documents and information requested by Council.

B. Reports to Council and Transportation & Development Committee

Staff proposes to prepare a monthly report on the Airport Master Plan Update and Noise Program for review by the Transportation & Development Committee which will be reported to the full Council as a General Government cross-referenced item on the following Council agenda.

COORDINATION

These recommendations have been coordinated with the City Manager's Office and City Attorney's Office.

COST IMPLICATIONS

The Airport 1991-92 CIP includes funding for consultant costs associated with the Master Plan Update EIR/EA, Economic Impact Study, General Aviation Task Force, and Runway 30L Extension, as well as for a new noise monitoring system, hush house preliminary design, and Runway 30L construction.

The recommended amendment to the contract agreement with TRA (Master Plan Update) includes no change to the existing contract cost ($842,282) at this time. Further refinements to TRA's work scope, and/or budget, may be proposed as a future, additional contract amendment.

The recommended amendment to the contract agreement with David J. Powers & Associates (Runway 30L Extension EIR/EA) changes the contract cost from $59,250 to $84,175, an increase of $24,925.

BUDGET REFERENCE (Runway 30L Extension EIR/EA)

Fund:	520
Responsibility:	520-80074443
Budget Document:	Airport 1990-91 Adopted Capital Budget, Page 25, Item 29

Ralph G. Tonseth
Director of Aviation

RGT:kph

Attachment

WORK PROGRAM ELEMENTS	1991		1992				1993			
	3	4	1	2	3	4	1	2	3	4
I. AIRPORT MASTER PLAN UPDATE										
A. EIR/EA										
1. Consultant Selection	X									
2. Scoping Of Alternatives (6, 8, 9)	X	X								
3. Evaluation Of Alternatives (6, 8, 9)		X	X	X	X	X				
4. Evaluation Of Mitigation Measures*	X	X	X	X	X	X				
5. Completion/Certification						X	X			
B. Update Of Analysis To Date	X	X	X							
C. Economic Analysis (1990 and EIR Alternatives)	X	X	X	X	X					
D. Implementation Program							X	X		
E. Airport Layout Plan Package								X	X	
F. Final Documentation And Adoption								X	X	
II. MASTER PLAN PROCESS ORDINANCE						X				
III. GENERAL AVIATION TASK FORCE	X	X								
IV. RUNWAY 30L EXTENSION										
A. Design	X	X								
B. EIR/EA	X	X								
C. Bid And Award			X							
D. Construction				X	X	X	X	X	X	
V. AIRPORT NOISE PROGRAM										
A. Noise Monitoring System	X	X	X	X						
B. Modified Noise Reports	X	→	→	→	→	→	→	→	→	→
C. Analysis Of Federal Noise Regulations	X									
D. Engine Run-up Operational Changes	X									
E. Good Neighbor Program	X	→	→	→	→	→	→	→	→	→
F. Stage 3 Airline Operations	X	→	→	→	→	→	→	→	→	→
VI. GENERAL										
A. Document For All Recommendations	X									
B. Regular T & D Committee Reports	X	→	→	→	→	→	→	→	→	→
C. Monthly Council Reports	X	→	→	→	→	→	→	→	→	→

* Evaluation of a noise ordinance will occur at the earliest possible time

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ATTACHMENT D

BACKGROUND TO AIRPORT OPERATIONS

Attachment D
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BACKGROUND TO AIRPORT OPERATIONS

INTRODUCTION

The regulatory history of the aviation industry indicates that there has always been federal control over aspects of airport operations./1,2/ Legislation established federal regulatory control over:

- the development and operation of domestic air routes (through control of the airspace, and rules over where aircraft fly and the procedures pilots use);
- the control of air traffic (through the development and operation of airport traffic control towers and other navigation/communication facilities); and
- the development and operation of airports (through conditions attached to federal funding of airport construction, among other rules)./1,2/

Historically, the operations of commercial airlines, including their decisions about what markets (cities and airports) to serve, were also regulated. The Airline Deregulation Act of 1978 lifted many of the federal economic controls over the airlines, including control over the establishment or discontinuance of domestic service at most U.S. airports./1,2/

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Recent federal legislation has emphasized the need to develop and increase airport capacity; the connection between airport noise problems and local opposition to capacity increases; and the possibility that local airport access restrictions (for noise purposes) "could impede" the operation and continued development of the national air transportation system./3,4/

The agencies most involved with the current regulation of SFIA activities are the Federal Aviation Administration and the California Department of Transportation, Division of Aeronautics. Some of the ways the FAA controls the operation of SFIA (and other airports) include:

- The FAA operates the SFIA Traffic Control Tower, from which it controls aircraft landings and takeoffs on the Airport's runways, and the movement of aircraft in the airspace around SFIA.

- The design, location, and construction of airside and landside facilities at SFIA must comply with federal standards (particularly if federal funds are used).

- In order to receive federal funding, SFIA must comply with specified "grant assurances" (conditions), including the requirement to make the airport "...available as an airport for public use on fair and reasonable terms and without unjust discrimination, to all types, kinds, and classes of aeronautical users."/5,6/

Appendix A includes a summary of federal legislative history, a discussion of the key legislation governing the operation of airports, and a discussion of the functions of the FAA and the Division of Aeronautics.

EXTENT OF LOCAL CONTROL OVER AIRPORT OPERATIONS

Given the extent of federal and state regulatory control over airport operations, there is a question as to what airport owners are able to do to regulate the use of their facilities.

The question has been raised in the context of restrictions some airports have imposed in order to reduce congestion or noise problems. Examples of such restrictions include requiring that some users shift their flights to other (less busy) airports; setting a limit on the number of flights per hour; prohibiting flights by aircraft that do not meet an airport's noise standards; and setting user fees that "more realistically" reflect the costs imposed on an airport during certain times (such as congested peak hours, or nighttime hours)./1/

These and similar restrictions imposed by airport owners have been challenged in court. The following paragraphs discuss the limited powers granted to airport owners, the potential areas of control airports do have, the requirement that airport restrictions be reasonable and not discriminate unjustly, and the meaning of "unreasonable" and "discriminatory" when applied to restrictions imposed at several U.S. airports.

There is disagreement among airport operators, airlines, and regulatory agencies regarding the limits of local airport control. The following discussion, therefore, does not offer any conclusions about the ability of an airport such as SFIA to restrict or divert airline flights.

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[San Francisco
International Airport
1991]

LIMITS OF LOCAL CONTROL

There are a number of laws and court decisions that specify or limit the powers of an airport owner. Through federal and state legislation, certain powers have been granted to the Federal Aviation Administration, the U.S. Department of Transportation, and the California Department of Transportation, Division of Aeronautics. The functions (and regulatory powers) of these agencies are discussed in Appendix A.

Section 1305 of the Federal Aviation Act of 1958 allows a local government to own and operate an airport. Under most circumstances, local governments have "police powers" that allow them "...to legislate in broad areas of scope including economics, the environment, morality, law and order, and peace and quiet..." Historically, the Supreme Court has superseded local police powers "...only when Congress exhibits a clear and manifest purpose to do so."/7/

A local government acting as an airport owner, however, is not able to use all of its police powers to run and regulate airport operations (because certain powers have been granted to the federal government, as noted above). "While section 1305 allows local authorities to operate airports as proprietors [owners], the grant [of power] is limited..."/7/

Under the state Public Utilities Code, the State of California has authority over "the space above the land and waters of this state." The Code also establishes the "right of flight" within this airspace. The right of flight includes "the right of safe access to public airports."/8/

POTENTIAL AREAS OF CONTROL: NOISE, CONGESTION, AND OPERATING EXPENSES

Purposes for which airport owners have been allowed to impose restrictions include the reduction of noise, the reduction of ground congestion, and the recovery of airport operating expenses./7/

Noise

"...the Supreme Court recognizes that noise control is a necessary area excluded from federal jurisdiction and left to local authorities."/7/ Many U.S. airports, including

SFIA, have successfully imposed restrictions for noise-reduction purposes. The enforcement of some of these restrictions has resulted in the denial of access (use of the airport) to certain types of aircraft.

Airports' powers to impose noise restrictions may have been limited by the Airport Noise and Capacity Act of 1990, however. Under the Act, new aircraft or noise restrictions on Stage 3 ("quiet") aircraft must be approved by the Secretary of Transportation. The Secretary has indicated that the Department of Transportation might challenge new airport noise restrictions that the Department considers too much of an economic hardship on the airlines (by requiring the airlines to retire noisy aircraft sooner, for example), or too restrictive on the operation of the airport system nationwide./4,9/

Congestion

The following excerpt from a legal commentary outlines potential means of relieving airport congestion:

> "The two principal methods that have been upheld to relieve airport congestion are perimeter rules and peak-period landing fees. Perimeter rules seek to relieve congestion at an airport by restricting incoming and outgoing flights to destinations within a certain distance of the facility... Peak period landing fees seek to relieve congestion during the time of the day when airlines are most likely to schedule flights by making the times when the airport is operating at a lower capacity more financially attractive..."/7/

Operating Expenses

Airports may impose restrictions (in the form of fees) in order to recover operating expenses:

> "...few owners would operate an airport if they were unable to recapture most, if not all, of their operating expenses. Thus, Congress provided that airport operators could maintain a fee and rental structure that made the airport as self-sustaining as possible. In interpreting Congress' provisions, courts liberally construe what constitute 'expenses' in providing facilities and services to airport users."/7/

TESTS FOR LOCAL AIRPORT RESTRICTIONS: "REASONABLE" AND "NONDISCRIMINATORY"

The tests established by legislation and applied by courts to airport restrictions have involved two key requirements: the restriction must be "reasonable"; and the restriction must not discriminate "unjustly."/7,10/

Under the Airport and Airway Improvement Act of 1982, any airport that receives federal funds must "...make its facilities available on 'fair and reasonable terms and without unjust discrimination.'" An airport, for example, cannot impose a restriction that discriminates unjustly against a class of users, such as general aviation aircraft, or a particular user, such as a specific airline./7/

The Federal Anti-Head Tax Act allows airports to collect "reasonable" fees for the use of their facilities. "Reasonable" fees, given the language of the Airport and Airway Improvement Act, are fees that "accurately reflect the cost of operating the facility."/7/

In the context of the application of these requirements to the areas where airport owners have control, an airport owner can impose a noise restriction if it is needed to mitigate an airport noise problem and if it is not "unreasonable, arbitrary, discriminatory, or a burden on interstate commerce." "Courts will uphold perimeter rules and peak-period fees [established by multi-airport authorities] as long as the restrictions are reasonable, nonarbitrary, and nondiscriminatory rules that advance the local interest."/7,10/

Interpretations of "Reasonableness" and "Discrimination"

The following discussion of the use of a special fee structure at Boston Logan International Airport addresses the question of what makes an airport restriction reasonable.

> "The most recent [court] decision...occurred in late 1989 in *New England Legal Foundation v. Massachusetts Port Authority*. In that case, the Massachusetts Port Authority (Massport), which owns and operates Logan Airport in Boston, wanted to maximize the efficient use of its facilities. It adopted a phased plan which began with a...fee structure consisting of two elements [a standard fee and an additional charge based on aircraft weight]. ...the effect of...the plan was to increase drastically the cost per landing of small aircraft while decreasing that of large aircraft. The resulting formula departed from the traditional method of calculating landing fees, and several groups consisting of small aircraft users brought a legal challenge against the fee structure."/7/

The final court ruling on the case upheld the Department of Transportation's ruling against Massport. From the ruling and Department of Transportation decision on the case, it has been concluded that:

- A "reasonable" fee or charge "fairly and rationally reflects the cost to comparably situated users" (the court found that the fee put a disproportionate share of airport costs on small aircraft); and
- The charge must be developed through a "nonarbitrary" methodology, and must accurately reflect airport costs ("...the court believed that Massport's fee structure was unreasonable because its methodology for allocating costs was 'not scientifically derived'").

/7/

"The issues of discrimination and reasonableness are frequently interconnected." In a case involving local noise control regulations that prevented certain aircraft from operating at John F. Kennedy International Airport, the court determined that the Port Authority of New York and New Jersey used reasonable procedures to establish an acceptable level of aircraft noise. Since the procedures were reasonable and the restriction was "rationally related to a legitimate state interest," the court determined that the noise restriction was not discriminatory./7/

In a case involving the perimeter rule imposed by the FAA which prohibited air carriers from operating nonstop flights between Washington National Airport and any airport more than 1,000 miles away, "The court held that an airport proprietor may make reasonable regulations concerning the efficient use of navigable airspace,..." In a case involving a perimeter rule established for LaGuardia Airport, an important factor was that "long-distance air traffic was not prohibited from entering New York area airports but was only diverted from one airport to another..."/7/ An additional factor in both cases was that the airports were part of a multi-airport system operated by one authority, which had the ability to accept the (diverted) air traffic at another airport in the system./10/

> "The court noted that while all regulations tend to discriminate in some way, the important inquiry is whether the discrimination is reasonable in light of the legitimate objectives the proprietor seeks to achieve. After noting that the control of ground congestion is a legitimate proprietary function, the court agreed with the authority's belief that the perimeter rule would keep LaGuardia from experiencing delays and congestion."/7/

In a case involving SFIA and its denial of access (introduction of service) to an aircraft operated by Burlington Northern Air Freight, the FAA charged that SFIA had discriminated unjustly and unreasonably against the airline, mainly because SFIA allowed noisier aircraft (than the Boeing Q-707 denied access) to use the Airport. The Ninth Circuit Court of Appeals recently ruled in favor of the FAA. Because the FAA found that SFIA had violated its grant assurances, the FAA has withheld federal funds from SFIA since Fiscal Year 1986./10/

AIRPORT ECONOMICS

AIRPORT BUSINESS OPERATIONS

The following summary of selected aspects of airport administration and finance is included to show the extent to which the airlines serving SFIA "share the risks and responsibilities for airport operations."/1/

Sources of Operating Revenue

According to a standard text on airport management:

> "At large air carrier airports, the main sources of operating revenue are air carrier landing fees, concession fees, and charges for the use of terminal areas and hangars. At large commercial airports, landing fees (usually based on the weight of the airplane) pay for the use of airfield facilities. Concession contracts provide revenue for the use of terminal areas... Airlines pay rent for leased areas..., usually based on the amount of area rented... These sources provide an airport's operating revenue... "/1/

Funding of Airport Development Projects

The following paragraph describes the means of funding airport development projects:

> "Airport construction, development, and improvement require large amounts of capital. Airports obtain this capital from a number of sources, including the sale of bonds and state and federal grants. There are three basic kinds of bonds: general obligation, revenue, and hybrid, such as self-liquidating general obligation bonds."/1,2/

Most of the capital needed for SFIA development projects has been raised through the sale of revenue bonds, which "are backed by the revenue to be generated by the facilities."/1/

"At the federal level, grants are available under the [Airport and Airway Safety and Capacity Expansion Act of 1987] for airport improvements, ATC facilities and equipment, and airspace system operation and maintenance."/1/

Airport and Airline Assumption of Risk

At airports such as SFIA, the airlines assume some of the responsibilities and risks of airport operation:

> "The large and medium-size publicly owned airports typically operate in conjunction with privately-owned airlines. This public/private character distinguishes the financial management and operation of these airports from those of organizations that are either completely publicly owned or completely privately owned... The risks and responsibilities of airport operations for air carrier airports are shared between the airport operator and the airlines that use the airport. Terms and conditions of the relationship between the airport and the airlines are contained in legal documents known as airport use agreements."/1/

> "In some cases [such as the airport use agreements used at SFIA], airlines agree to pay any costs of operating an airport or servicing its debt that are not recovered from other users. This is known as the residual cost approach to pricing; its implementation transfers a significant portion of the financial risk to the airlines, since they agree to make up the operating deficits."/1,11/

If the proposed SFIA Master Plan improvements are financed with revenue bonds, payment of the bonds would be backed by Airport revenues, with the airlines covering debt payment costs not recovered from other Airport users.

AIRLINE DEREGULATION, HUBBING, AND COMPETITION

The nature of the airline service provided at SFIA and the other Bay Area airports is influenced by the development of the hub-and-spoke route system. The ability to "manage" or influence service and demand at these airports is also influenced by hubbing, and by the presence of barriers to market entry.

Deregulation and Hubbing

Hubbing is defined as follows:

> "Hubbing is an operational system in which flights from numerous points arrive at and then depart from a common point within a short time frame so that passengers arriving from any given point can connect to flights departing to all other points..."/12/

Most air travel within the U.S. involves hubbing operations./13/ "...an airport in a hub and spoke system where a carrier or carriers elect to crossconnect passengers on a large scale" is a "connecting hub."/12/ Some of the airports currently used as connecting hubs include Denver Stapleton International Airport, Dallas / Fort Worth International Airport, Atlanta Hartsfield International Airport, and Memphis International Airport.

SFIA is not a connecting hub airport; most of the passengers using the Airport are coming from or going to locations in the Bay Area. However, United Airlines uses the Airport as a hub for connections among its international, Hawaii, long-haul domestic (such as to Chicago or Washington), and intrastate flights. San Jose International Airport is currently used as a connecting hub by American Airlines. Metropolitan Oakland International Airport is not used as a connecting hub.

Airline Competition

During the decade following deregulation, the domestic airline industry underwent "significant structural and operational change," expanding from 30 large air carriers in 1978 to 38 carriers in 1984, then, through a series of mergers and acquisitions, consolidating into 8 large carriers (in 1988-1989)./12/

In the past several years, concerns have been raised about the competitiveness of the airline industry, and the potential need for "reregulation." The Secretary of Transportation commissioned a high-level task force to conduct a comprehensive assessment of airline competition. The assessment addressed, among other topics, the industry and route structure and the existence of barriers to airline entry into markets./12/

Industry and Route Structure

The DOT Task Force study of market structure found that:

- Competitive airline service to more destinations is provided to more people by more airlines.
- Airline concentration has increased at larger airports, and decreased at smaller airports.

- There has been a "dramatic increase" in the number of markets served nationwide.

- "The hubbing process by its very nature requires a large volume of frequent service and this leads naturally to a relatively high degree of concentration. Moreover, once hubs are established, carriers have a strong incentive to attempt to increase their control of traffic at their connecting hubs.

- "Virtually all non-hubbing carriers have stopped competing with nonstop service in city pairs involving a highly concentrated connecting hub. The number of nonstop competitors in city-pairs involving concentrated hubs, therefore, is essentially limited to carriers that hub at either end point.

- "In view of the substantial load factor advantage enjoyed by dominant carriers at highly concentrated connecting hubs, in the absence of price deviations which could cause such differences, any expansion of service can be expected to involve the least risk where a carrier already has a high degree of concentration and the most risk where another carrier has a high degree of concentration...this would seem to encourage carriers to expand service by extending dominance at existing hubs or creating new hubs rather than by trying to compete at another carrier's hub."/12/

Barriers to Market Entry

"Generally, barriers to entry are practices or conditions that may impede a firm's ability to enter a market."/14/ If there are barriers (see following examples) to the entry of airlines at San Jose International Airport and Metropolitan Oakland International Airport, or if the practices used to operate SFIA favor the airlines' continuation or expansion of service at SFIA, it would be more difficult to change or "manage" the service provided at each of the three airports.

The Task Force Study of potential barriers to market entry "...addresses the availability of airport gates and associated facilities and services that are necessary for air carriers to serve an airport." The study found that "...gate facilities are a potential barrier to entry into both the aviation industry and into individual markets for firms already in the industry... Without gate facilities, an air carrier is effectively barred from serving a specific market."/11/

Three factors found to contribute to the lack of gate facilities at airports are the unavailability of gate capacity, the use of exclusive-use leases, and the airlines' right to approve airport decisions.

Underutilized Gate Capacity. "There is very little underutilized terminal and gate capacity at the large airports today... An airline requires at least one full-service gate to serve an airport in a minimum fashion, say as a spoke operation. It needs 5-10 adjacent gates to start a hub... Overall, short run gate capacity is very limited." A survey conducted in 1989 found that SFIA had no gates available at that time, and would have 4 gates available 180 days later./11/

Exclusive-Use Leases. "The 1983 Report to Congress identified...[that] airport facility areas...are typically leased to carriers on an exclusive basis for extended periods of time, usually 15 to 30 years..." At an airport with long-term, exclusive-use leases, an airline trying to introduce service would have to sublease gates from the leaseholder, probably at a higher cost./11/

SFIA has standardized long-term (10-30-year) exclusive-use contracts. "This contract is the result of a 1981 lawsuit against the airport by the airlines."/15/ As of 1990, 20 of the 65 carriers serving the airport leased gates under this contract, and the remaining carriers subleased gates from the airlines, or leased gates from the airport on a month-to-month basis. All gates at SFIA are currently used by some carrier./15/

San Jose International Airport also has long-term exclusive-use leases on airport facilities./16/

Majority-In-Interest. In many airport leases, certain airlines are "given the right, through what is called a 'majority-in-interest' (MII) clause, to approve certain airport decisions... The matters subject to MII approval...generally...involve major decisions that affect airport costs, such as capital improvements or expansions, added debt, and new bond issues. The 'interest' power also varies, and can range from absolute veto power to simply requiring project reviews./11/

> "The prevalence of MII tends to be correlated with the type of financing for airports. Under the residual cost method [used at SFIA], airlines take a substantial risk, generally as guaranteeing payment of all airport costs not covered by non-airline sources of revenue. In return, they are charged landing fees and rates for space that are calculated after all other sources of revenue are taken into account. If car rental, parking, and concession income goes up, an airline's costs for use of space can go down. The airlines assume financial risks and the airlines have an interest in seeing that the airport is operated to minimize the residual costs to be covered by the air carriers."/11/

The signatory carriers at SFIA and San Jose International Airport operate under residual cost use agreements, with the right of MII approval. As of Spring 1989, SFIA needed airline approval for large capital projects, adjustments in landing fees or terminal rates, new bond sales, or additional rates, fees, or charges./11/

"Many use agreements contain a 'no additional rates, fees, or charges' clause that prevents the airport from raising new revenue for airport development by levying fees on airlines, unless specifically authorized..." In a 1989 survey, SFIA reported that it had restrictions on charging additional rates, fees, and charges, and was prevented from changing the method of calculating landing fees./11/

AIR TRAVEL DEMAND

General Characteristics

The factors that are usually considered when analyzing or forecasting air travel demand include:

- Purpose of trip. "...most people use air transportation as a means to achieve some other purpose... Consequently, when trying to estimate passenger demand, it is necessary to go into all the various reasons that make a destination city attractive... Passengers can be divided into categories by looking at the purpose of their trip. Typically the simplest of the divisions is into tourist or business travel..."/13/
- Variability. "Passenger demand for any mode of transportation varies greatly by the hour of the day, the day of the week, and in most markets by the season of the year." For example, in a vacation travel market, the demand may be significantly higher during the summer than in the other seasons of the year./13,17/
- Passenger origins and destinations.
- Population of the region served by the airport. "The size and composition of the area's population - and its potential growth rate - are basic ingredients in creating demand for air transportation services."/18/
- Employment of the region served by the airport.
- Disposable income.
- Regional economy. "In addition to overall national and regional economic activity, this factor includes consideration of specific, identifiable, local activity that distinguishes the geographic area served by the airport from the aggregate conditions across the region. This factor is particularly important in connection with business travel by commercial and general aviation and with air freight traffic."/18/

- Price of airline travel.
- Frequency of service, defined as the convenience of travel between two points. "The larger the number of flights the more convenient are the departure and arrival times likely to be."/17/
- Level of service, such as the use of frequent flyer programs, or an airline or airport's on-time performance record.
- Overall travel time./13,17/
- External factors, such as fuel price changes, changes in the regulatory environment, and the granting of new routes for international service./18/
- Local aviation actions. "The types of ground access and support services provided, user charges, and plans for future development can each affect future growth of aviation demand."/18/

Demand and Service in a Multiple-Airport Region

In the San Francisco Bay region, travelers have more than one airport from which to choose:

> "Airport choice occurs in metropolitan areas that are served by more than one airport. In such areas, it may happen that a traveler can choose between a closer airport with access travel advantages and a farther airport with schedule frequency advantages."/17/

A model used to study airport choice for travel between the San Francisco and Los Angeles metropolitan areas considered the total travel time, the schedule frequency, and the air fare. The results of the model showed that "...business travel is more sensitive to schedule frequency and less sensitive to fares than nonbusiness traffic."/17/

The 1990 Air Passenger Survey conducted by the Metropolitan Transportation Commission (MTC) found that "The most commonly cited determinant of airport choice, regardless of air party characteristics, was closeness to residence, hotel or business." The survey also found that "San Francisco and Oakland airports...have a greater portion of respondents [than San Jose] citing service competition [flight availability, frequency, and fares] as their main reasons for choosing one of the two airports."/19/ Other MTC survey results can be found in Attachment A to this packet.

NOTES - Background

/1/ Taneja, Nawal K., *Introduction to Civil Aviation*, Lexington Books, 1987.

/2/ Smith, Donald I., John D. Odegard, and William Shea, *Airport Planning and Management*, Wadsworth Publishing Company, 1984.

/3/ Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223, House Report and House Conference Report.

/4/ Airport Noise and Capacity Act of 1990.

/5/ Horonjeff, Robert, and Francis X. McKelvey, *Planning and Design of Airports*, McGraw Hill, Third Edition, 1983.

/6/ Federal Aviation Administration, "Part V, Assurances, Airport Sponsors," grant assurances under the Airport Improvement Program, October 1, 1990.

/7/ Pennington, William, "Airport Restrictions: A Dilemma of Federal Preemption and Proprietary Control," in *Journal of Air Law and Commerce*, Volume 56, Number 3, Spring 1991.

/8/ "State Aeronautics Act," Division 9, Public Utilities Code, State of California.

/9/ "FAA Eases Plan to Phase Out Noisy Jets Amid Strong Pressure," *New York Times*, September 25, 1991.

/10/ Daphne Fuller, Staff Attorney, Federal Aviation Administration, telephone conversation, October 1, 1991.

/11/ U.S. Department of Transportation, *Secretary's Task Force on Competition in the U.S. Domestic Airline Industry, Airports, Air Traffic Control, and Related Concerns (Impact on Entry)*, February 1990.

/12/ U.S. Department of Transportation, *Secretary's Task Force on Competition in the U.S. Domestic Airline Industry, Industry and Route Structure*, Executive Summary, February 1990.

/13/ O'Connor, William E., *An Introduction to Airline Economics*, Praeger, Fourth Edition, 1989.

/14/ United States General Accounting Office, *Airline Competition: Effects of Airline Market Concentration and Barriers to Entry of Airlines*, April 1991.

/15/ California Public Utilities Commission, *Fares, Service, and Terminals, Staff Final Report on Airline Service Within California*, March 7, 1990.

/16/ Steve Grossman, Deputy Director of Finance, San Jose International Airport, telephone conversation, September 25, 1991.

/17/ "Transportation Demand Analysis," handout accompanying presentation by Adib Kanafani, University of California - Berkeley, Course in Airport Systems Planning and Design, April 30 through May 3, 1990.

/18/ Federal Aviation Administration, Advisory Circular 150/5070-6A, "Airport Master Plans," June 1985.

/19/ Metropolitan Transportation Commission, *1990 Air Passenger Survey, San Francisco Bay Area*, August 1991.

APPENDIX A: SUMMARY OF FEDERAL REGULATORY HISTORY

FEDERAL REGULATORY HISTORY

The federal government has regulated the aviation industry in the United States from the early days of domestic air service. In addition to economic and safety controls on the airlines, regulation has included rules for the development and operation of the domestic airway system, the control of air traffic, and the development and operation of airports. The following "highlights" of federal regulatory history are included to show the extent and complexity of the regulatory framework within which SFIA and other U.S. airports operate.

Early Regulation (1925-1934)

Federal regulation of the aviation industry began with the Air Mail Act of 1925 (the Kelly Act) and the Air Commerce Act of 1926. The Kelly Act resulted in the transfer of airmail operations from the Post Office Department to private carriers. (Regular air passenger service was not established before 1925; most regularly scheduled air services were airmail flights conducted by the Post Office Department.) The Air Commerce Act "...initiated the development of civil airways and navigational aids and provided for safety regulations requiring that airplanes, pilots, and navigational facilities be registered, examined, and certificated." The Air Commerce Act made the aeronautics branch of the Department of Commerce responsible for "...promoting and fostering the development of commercial aviation as well as for regulating the business aspects of air transportation."/1,2/

"Until the early 1920s, a substantial number of airports in the United States had been privately owned and operated." Congress concluded, in developing the Air Commerce Act, that "...the control and operations of airports were... the responsibility of municipal authorities."/1,2/

> "...the Air Mail Act of 1934 (the Black-McKellar Act)...set up a threefold control of the air transport industry: (1) airmail contracts were to be awarded by the Post Office Department; (2) the Interstate Commerce Commission was put in charge of setting 'fair and reasonable' airmail rates; and (3) the Department of Commerce was made responsible for the regulation of safety and the maintenance, operation, and development of the airway system... The act also established the five-man Federal Aviation Commission to study federal aviation policy and recommend future policy. The most important recommendation of this commission was the creation of a separate agency for economic regulation of the civil air transport industry."/1,2/

Civil Aeronautics Act of 1938

The Civil Aeronautics Act of 1938 established economic regulation of the airlines:

> "The Civil Aeronautics Act of 1938 placed the development, regulation, and control of air carriers under the jurisdiction of the Civil Aeronautics Authority (later known as the Civil Aeronautics Board, or CAB). This authority, for the first time, subjected the airlines to rigorous economic regulation. Carriers that wanted to offer commercial service were now required to obtain from the CAB a Certificate of Public Convenience and Necessity, specifying the points to be served and the services to be provided... The CAB exercised complete power to determine 'fair and reasonable' rates for the transportation of passengers, property, and mail. The CAB also had the power to regulate competition; to decide on consolidations, mergers, and acquisitions..."/1,2/

An Air Safety Board within the CAB was created to promulgate Civil Air Regulations. However, enforcement of the regulations was the responsibility of the aeronautics division of the Commerce Department. The aeronautics division was also "...made responsible for the operation of the airways and control towers and the administration of funds for the development of airports."/1/

> "The prohibition against federal construction of airports, a part of the Air Commerce Act of 1926, had been omitted... The Civil Aeronautics Act directed the administrator to make a field survey of existing airports and present a recommendation to Congress in 1939 on whether the government should participate in the construction, improvement, development, or maintenance of the national system of airports."/2/

The administrator recommended that the "...development and maintenance of an adequate system of airports was in the national interest..."/1/ Congress appropriated $40 million for the development of airports in 1940./2/

Transportation Act of 1940

The Transportation Act of 1940 established the Civil Aeronautics Board (replacing the Civil Aeronautics Authority) and the Civil Aeronautics Administration (CAA, which was the predecessor to the Federal Aviation Agency, which later became the Federal Aviation Administration). The CAB was responsible for economic regulation; the CAA was responsible for safety regulation. The CAA's authority was extended during World War II to include air traffic control of all airways./2/

World War II

World War II affected U.S. airport development:

> "...defense considerations led to the decision to upgrade existing airports and to develop new airports... Congress... appropriated specific funds to construct and improve airports that were considered vital for national defense. After the war, the Federal Airport Act of 1946 increased the size of the airports program by providing $500 million over the next 7 years. The recipients of federal funds were required to comply with the new standards established by the CAA, such as site location, airport layout, lighting, and the safety of approaches."/1,2/

The air traffic control system was upgraded after World War II, including the establishment of approach control facilities, use of long-range radar, establishment of an accurate navigation system and installation of instrument landing systems, and improvements in communications equipment. The Office of Air Traffic Control was established in 1956./1/

Federal Aviation Act of 1958

The Federal Aviation Act of 1958 amended and replaced the Civil Aeronautics Act of 1938:

> "The new act established the Federal Aviation Agency (FAA) as a separate government agency...Its functions were to regulate airspace; to acquire, operate, and develop air navigation facilities; and to prescribe air traffic rules for all aircraft. The safety regulations became known as the Federal Aviation Regulations (FARs). Although regulation of safety was under the jurisdiction of the FAA, investigation of civil aircraft accidents was still the responsibility of the CAB. The CAB's economic regulatory authority was left unchanged."/1,2/

The FAA was also given the authority to approve the siting of airports and to administer airport development funds./1/

Creation of Department of Transportation (DOT)

The U.S. Department of Transportation was created in 1966:

> "...to provide total transportation planning, policy guidance, and protection of the public interest - with the aim of achieving an integrated national transportation system based on economic criteria rather than on modal preferences... The FAA (now Federal Aviation Administration) was reorganized and became part of the DOT. In the area of air safety, the FAA administrator was given cabinet-level functions, powers, and duties. The Air Safety Board became the National Transportation Safety Board..."/1,2/

Airport Development in the 1970s

In the 1970s, Congress authorized funding for airport development:

> "In 1970, the Airport and Airway Development Act and the Airport and Airway Revenue Act were passed to allow for the expansion, improvement, and funding of airways and airport systems... The Airport Development Aid Program (ADAP), part of the Airport and Airway Development Act, allowed an expenditure of $2.5 billion for the improvement of existing airport facilities and for the construction of new airports. Under the Airport and Airway Revenue Act, the Airport and Airway Trust Fund was established with money collected from the users of the system."/1,2/

Airline Deregulation Act of 1978

The Airline Deregulation Act was "...intended 'to amend the Federal Aviation Act of 1958, to encourage, develop and attain an air transportation system which relies on competitive market forces to determine the quality, variety, and price of air services and for other purposes.'" Former policy had been "'...oriented towards the creation and governmental promotion of an air transportation system and the protection of the air transport industry through essentially public utility-type regulation.' It was often interpreted as allowing or even requiring anticompetitive policies."/2/

Under the Civil Aeronautics Act of 1938, the CAB granted certificates to airlines for proposed service "...only if it found that the...service was 'required by the public convenience and necessity.' The board also had to find that the airline was 'fit, willing, and able' to perform the service..." Certificates were granted through "complicated and time-consuming procedures." Under deregulation, airlines are still required to obtain certificates of fitness from the Department of Transportation, but other controls over airline entry into (and exit from) most domestic markets have been eliminated. (Service to certain small communities is regulated under the Essential Air Service program.)/1/

Deregulation was achieved in phases. Passenger airline operations were deregulated as of October 1978. The CAB's authority to assign air routes ceased in 1982; authority relating to rate making was terminated in 1983. The CAB ceased to exist as of January 1985; its remaining responsibilities (such as the regulation of international transportation) were transferred to the Department of Transportation. (DOT approval of airline mergers ceased in 1988; mergers are subject to the antitrust laws administered by the Department of Justice.)/1,2/

Airport and Airways Improvement Act of 1982

Funding authorization for airport development under ADAP (established by the 1970 Airport and Airway Development Act) expired in 1980. The Airport and Airways Improvement Act of 1982, enacted to implement the FAA's National Airspace System Plan for Facilities, Equipment and Associated Development, authorized funding for airport development under the Airport Improvement Program (AIP)./1,2/

Recent Legislation

Airport and Airway Safety and Capacity Expansion Act of 1987

The Act amends the Airport and Airway Improvement Act of 1982 "for the purpose of extending the authorization of appropriations for airport and airway improvements, and for other purposes." Concerns expressed by Congress during the drafting of the legislation include the large, unspent balance in the Airport and Airway Trust Fund, the need for continued development of the national airport and airway system (especially airport capacity and air traffic control modernization), and the need to make further progress in achieving airport noise compatibility./3/

The Act:

- Authorizes $8.7 billion through Fiscal Year 1992 for the Airport Improvement and Noise Abatement Programs;
- Authorizes $5.3 billion through Fiscal Year 1992 for the FAA's Facilities and Equipment programs, to implement the FAA's plan for the modernization of the air traffic control system;
- Sets forth formulas for the apportionment of federal funds;
- Amends the federal grant assurances regarding the provision of access on a nondiscriminatory basis, the protection of terminal airspace, the requirement that airport revenues must be spent on the airport, and the disposal of land purchased with federal funds for noise mitigation;
- Permits the issuance of a Letter of Intent to fund an airport project in future years;
- Provides that if an airport is not making reasonable progress toward developing or implementing a noise compatibility program, 10 percent of the funds apportioned to the airport shall be made available to local government for noise mitigation programs;
- Provides for a higher federal share for the funding of noise projects at certain airports;

- Requires the FAA Administrator "to conduct a study of innovative noise abatement proposals that are not currently eligible for federal assistance";
- Includes provisions and requirements for certain individual airports;
- Modifies existing law regarding the Essential Air Service program; and
- Extends excise taxes through December 31, 1990, with a "trigger" that the 1990 taxes be reduced if the total appropriations for airport improvements, facilities and equipment, and research, engineering and development are less than 85 percent of the total amounts authorized for these programs./3/

Airport Noise and Capacity Act of 1990

Among the findings in the Act are that

> "(1) aviation noise management is crucial to the continued increase in airport capacity; (2) community noise concerns have led to uncoordinated and inconsistent restrictions on aviation which could impede the national air transportation system; (3) a noise policy must be implemented at the national level;"/4/

The Act requires that the Secretary of Transportation "shall issue regulations establishing a national noise policy..." The policy "...shall be based on a detailed economic analysis of the impact of the phaseout date for Stage 2 aircraft on competition in the airline industry..." The Act establishes December 31, 1999 as the phaseout date for Stage 2 aircraft (for turbojet aircraft with a maximum weight of more than 75,000 pounds), with a possible waiver through 2003. The noise policy shall include a schedule for phased-in compliance, with interim deadlines./4/

On September 24, 1991, the FAA issued the regulations required by the Act. FAA's initial proposed rule would have required the phasing out of each airline's Stage 2 aircraft according to the following schedule: 25 percent by the end of 1994; 50 percent by 1996; 75 percent by 1998; and 100 percent by the year 2000. However, the airline industry argued for a more flexible approach, and the Secretary of Transportation "...ordered that the timetable be made more flexible out of concern for the economic viability of the airlines." As a result, the rule "...allows airlines, if they choose, to move toward compliance by first increasing the numbers of quieter aircraft in their fleets, rather than by starting right away to eliminate the noisier ones." The adopted deadlines are that 55 percent of an airline's entire fleet must be Stage 3 aircraft by 1994, 65 percent by 1996, and 75 percent by 1998./5/

The Act also requires that the national policy include a "program for reviewing airport noise and access restrictions on operations of Stage 2 and Stage 3 aircraft." Any airport noise or access restriction on the operation of Stage 3 aircraft effective after October 1990 is prohibited unless "...it has been agreed to by the airport proprietor and all aircraft operators" or has been approved by the Secretary of Transportation. A restriction on Stage 2 aircraft is allowed only if the airport operator conducts a cost-benefit analysis of the restriction and allows adequate time for public comment. Compliance with these provisions is tied to the receipt of federal funds and the eligibility to impose and collect "passenger facility charges."/4/

FUNCTIONS OF REGULATORY AGENCIES

The regulatory history presented in the previous section provides the framework for the current regulation of SFIA. The agencies most involved with the regulation of SFIA activities are the Federal Aviation Administration and the California Department of Transportation, Division of Aeronautics. Information on these agencies' functions is included to show the extent to which the operation of SFIA is subject to federal and state regulation.

Federal

Federal Aviation Administration

The FAA participates directly and indirectly in the operation of the Airport through its establishment and operation of the air traffic control (ATC) system; its regulation of aircraft and airlines, airport design and construction, and day-to-day aspects of airport management; and its administration of funds. The FAA performs the following functions:

- "Encourages the establishment of civil airways, landing areas, and other air facilities;
- "Designates federal airways; acquires, establishes, operates, and conducts research and development; and maintains air navigation facilities along such civil airways;
- "Makes provision for the control and protection of air traffic moving in air commerce;
- "Undertakes or supervises technical development work in the field of aeronautics and the development of aeronautical facilities";

- Develops and enforces the Federal Aviation Regulations, including the following:
  - aircraft noise certification (Part 36)
  - airport noise compatibility programs (Part 150)
  - rules for funding eligibility and fund procurement (Part 152)
  - acquisition of U.S. land for airports (Parts 153, 154)
  - release of federal airport property for public use (Part 155)
  - reporting actions relating to construction, alteration, activation, and
  - deactivation of airports (Part 157);
- "Provides for aircraft registration;
- "Requires notice and issues orders with respect to hazards to air commerce"; and
- "Issues operating certificates to airports serving air carriers [under FAR Part 139]."/1,6/

The FAA also develops the National Plan of Integrated Airport Systems and directs the federal airport aid program. "In this connection it performs the following functions:

- "Provides advisory assistance on airport planning, design, construction, management, operation, and maintenance;
- "Develops and establishes standards, government planning methods, and procedures (for airport planning, design, and construction, and management, operations, and maintenance);
- "Develops and recommends principles for incorporation in state and local legislation"; and
- "Secures compliance with statutory and contractual requirements relative to airport operation practices, conditions, and arrangements."/2,6/

Department of Transportation

As discussed on page A-5 above, the Department of Transportation regulates air service to small communities under the Essential Air Service program, and enforces economic controls on international air transportation.

State

The California Department of Transportation, Division of Aeronautics issues permits for the operation of airports in the state. (State permitting is conducted separately from the federal certification of airports under FAR Part 139.)/7/

Any changes to "airside" facilities at an airport require a revision to the state permit. Changes to landside facilities, such as those proposed under the SFIA Master Plan, do not require a revision to the permit./7/

The Division of Aeronautics conducts yearly inspections for compliance with the permit. The Division also enforces the Federal Aviation Regulations, which were adopted by the state under the State Aeronautics Act. The Code gives authority to the Division to develop additional regulations under Title 21 of the California Code of Regulations./7/

NOTES - Appendix A

/1/ Taneja, Nawal K., *Introduction to Civil Aviation*, Lexington Books, 1987.

/2/ Smith, Donald I., John D. Odegard, and William Shea, *Airport Planning and Management*, Wadsworth Publishing Company, 1984.

/3/ Airport and Airway Safety and Capacity Expansion Act of 1987, Public Law 100-223, House Report and House Conférence Report.

/4/ Airport Noise and Capacity Act of 1990.

/5/ "FAA Eases Plan to Phase Out Noisy Jets Amid Strong Pressure," *New York Times*, September 25, 1991.

/6/ Horonjeff, Robert, and Francis X. McKelvey, *Planning and Design of Airports*, McGraw Hill, Third Edition, 1983.

/7/ Gargas, Dan, Aviation Consultant, Caltrans Division of Aeronautics, telephone conversation, September 19, 1991.

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ATTACHMENT E
LETTERS FROM REGIONAL AGENCIES COMMENTING ON THE DRAFT EIR

Attachment E

REF
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attach. E

[San Francisco
International Airport
1991]

City & County of S.F.
Dept. of City Planning
SEP 18 1991
OFFICE OF
ENVIRONMENTAL REVIEW

MTC
METROPOLITAN
TRANSPORTATION
COMMISSION

September 16, 1991

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GORDON H. MCKAY

Executive Director
LAWRENCE D. DAHMS

Deputy Executive Director
WILLIAM F. HEIN

Ms. Barbara Sahm
Environmental Review Offices
450 McAllister Street, Sixth Floor
San Francisco, CA 94102

Dear Ms. Sahm:

The MTC staff have reviewed the San Francisco International Airport (SFO) Master Plan DEIR. The DEIR is a detailed and comprehensive document addressing proposed improvements at the Airport to the year 2006. The environmental document discusses forecasted traffic activity, airport development plans, and environmental impacts related to transportation, noise, air quality and other issues. As the regional transportation planning agency, MTC must develop and adopt a Regional Airport System Plan. The last regional airport plan was adopted in 1980, and the forecasts have been periodically reviewed and updated since that time (see below). MTC is now engaged in the comprehensive review and updating of the 1980 plan. The new RAP will examine airport system alternatives for 2005 and 2010.

MTC recently transmitted information to you under separate cover including: results of the 1990 MTC Air Passenger Survey at SFO, Oakland, and San Jose Airports, a memo to the Regional Airport Planning Committee on recommended regional air passenger forecasts (February 22, 1991), and a handout to the same committee on the preliminary airport system alternatives (distributed at the September 6, 1991 RAPC meeting). Specific MTC staff comments on the San Francisco International Airport Master Plan DEIR are provided below:

Forecasts and Regional Traffic Allocations

- The EIR would benefit from an expanded discussion of regional airport system alternatives including the compatibility of SFO airport improvement proposals with improvement proposals being developed in other ongoing airport master plan studies at Oakland and San Jose Airports. The DEIR should provide some discussion of how airline and airport facility investments and airline service decisions (such as creating new airline "hubs" for connecting flights) could either reinforce or change air service patterns at Bay Area airports.

- For clarification, the current regional airport plan air passenger forecasts and airport traffic assignments are different than those shown on page 110 (see attached excerpts for the MTC Regional Transportation Plan).

- The regional air passenger forecasts were last revised in 1986, and the airport traffic assignments were last revised in 1987. Note that the actual 1990 airport traffic shares for the Bay Area airports (page 120) are quite close to the recommended traffic allocations in the regional airport plan, i.e., the traffic allocations associated with a Bay Area traffic level of 43 Million Annual Passengers (MAP).

- The current regional airport plan recommends that Oakland and San Jose Airports serve a larger share of regional air traffic as air travel demand increases in the future. These recommendations stem from extensive previous analysis showing this strategy is essential to: balance available runway and airspace capacity (i.e., reduce excessive aircraft and passenger delays), provide more convenient and accessible air service to the Bay Area's population, provide noise relief to Bay Area residents, and to minimize vehicle travel and air pollution for ground trips to and from Bay Area airports. One of the reasons the Plan is now being revised is to coordinate ongoing airport master plan proposals for SFO, Oakland and San Jose Airports. San Francisco's master plan, for example proposes to serve 51.3 MAP in 2006, whereas the current policy limit in the regional airport plan is 31 MAP; similar conflicts with the regional airport plan exist at the other Bay Area airports. The question of how much additional airport capacity is needed and the optimum share of traffic for each airport is the subject of the current Regional Airport System Plan update due to be completed in the Spring of 1992. Airport system alternatives for the update study are now being defined through discussions with the ABAG/MTC Regional Airport Planning Committee (RAPC). San Francisco Airport's Master Plan should be consistent with the regional plan.

- MTC's "expected" forecast for the Bay Area is 62.6 MAP in 2005 and 70.7 MAP in 2010; these projections employ different methodologies than either the FAA forecast or the CASP forecast. However, the ABAG/MTC Regional Airport Planning Committee has also recommended that the plan update consider the long-term (20-25 year) capacity implications of a air passenger demand level of 84 MAP--which is similar to the forecast in the California Airport System Plan.

- In terms of airport system alternatives, the Regional Airport System Plan update will be looking at alternatives in which SFO's share of regional air traffic will most likely vary between the current 70% to a lower share of about 55%, reflecting substantial redistribution of air service to other airports. The Master Plan forecasts would be more consistent with retention of the current share.

Transportation Impacts

- The EIR indicates several highway segments and local intersections will deteriorate to Level of Service F as a result of projected future air traffic growth resulting from the master plan. MTC has reviewed the traffic data and assumptions in the DEIR and finds the methodologies and assumptions to be reasonable, given the air passenger forecast, including such factors as the air passenger and employee mode split, the projected use of the proposed BART extension to SFO, and the impact of the BART extension on airport parking requirements.

- Since the DEIR was prepared two additional BART extension alternatives were added to those previously under study by MTC: Alternative 5 (I-380 corridor to an "external" BART station on the airport's West of Bayshore property) and Alternative 6 (I-380 corridor to an "internal" station under the Airport's main garage). The decision on which alignment will be the preferred alignment to SFO will be a joint decision by MTC, BART, and SamTrans. This study assumes the Airport will finance, construct and operate an Automated People Mover system to the "External" SFO BART/CalTrain Station if this alignment is selected as the preferred alternative. Potential airport contributions to the capital and operating cost of the proposed BART extension will be evaluated by MTC in the ongoing BART extension study.

- The Transportation Impacts section does not adequately describe the mitigation of airport surface traffic impacts other than the impact of the proposed BART extension (and this is only discussed in relation to local intersections and parking demand; a discussion of the impacts on freeway segments would also be warranted).

- Specific mitigation measures that need greater elaboration include:

  - airport coordination activities with local agencies, including the San Mateo County Congestion Management Agency (CMA), to establish and maintain traffic LOS standards on key freeways and airport access routes as well as participation with the CMA in the development of deficiency plans to address unacceptable levels of service at intersections near the Airport

  - assistance in the planning and development of off-airport terminals (page 114 discusses this concept, but it is not listed on pages 12 - 13 which summarize potential transportation mitigation measures)

  - development of a pricing policy for parking which reduces auto access to the airport and encourages the use of transit and other high occupancy vehicle services

  - preferential access for public transit operators to the terminal curbside to place public transit on a competitive footing with auto access

  - defining a workable and effective commute alternatives program for airport employees given past experience which has shown how difficult it is for a majority of employees with different shifts and work hours to use carpools and transit

Noise:

- The growth in aircraft size appears to be higher than current industry trends would indicate.

- It would also be helpful if the noise impact information is reported both in terms of population and dwelling units within various noise contours.

Air Quality:

- The Bay Area Air Quality Management District has recently revised its recommendations for estimating future CO ambient background levels. These revisions will significantly affect the CO concentration analysis in Table 55 and the conclusions reached in that table.

- The EIR would benefit from a discussion of the regional (ozone) and local (carbon monoxide) reductions that would be achieved by increased use of transit and ridesharing modes by air passengers and airport employees. Also, the Airport should be aware of transportation control measures (TCMs) adopted by MTC in February 1990 as Contingency Measures for the 1982 Bay Area Air Quality Plan and proposed TCMs in the BAAQMD's 1991 Clean Air Plan to meet state air quality standards which may affect the transportation impacts discussed in the DEIR.

Should you have any questions about these comments, we would be pleased to provide additional information.

Sincerely,

Chris Brittle
Manager, Planning

CB:jlr
8942p/11

Regional Transportation Plan

For the Nine-County San Francisco Bay Area

1988

MTC
METROPOLITAN
TRANSPORTATION
COMMISSION

THE REGIONAL AIRPORT PLAN

In 1977, the Regional Airport Planning Committee (RAPC), a joint advisory committee of MTC and ABAG, began a major review of the Regional Airport Plan (RAP)--which provides long-range guidelines for development of air passenger, air cargo, and general aviation facilities in the Bay Area. The airport map following this text locates the facilities identified in the RAP. In accordance with Policy 5.6, the RAP shall guide MTC in its decisions concerning airport plans and development proposals. The RAP has the following major provisions:

- Expansion of the major air carrier airports. Airline service at San Francisco International Airport, Metropolitan Oakland International Airport, and San Jose Municipal Airport should be consistent with the regional plan and with master plans prepared for these airports. The regional plan recommends that airport improvement programs and local land use decisions be guided by the regional projections of air passenger demand and airport traffic assignments shown below:

PROJECTED BAY AREA AIR PASSENGER DEMAND
(Millions of annual passengers - on & off)

Time Frame	Total Bay Area Air Passengers
1995	40.8 - 46.8
2005	48.7 - 58.7

AIRPORT TRAFFIC ASSIGNMENTS
(Millions of annual air passengers - on & off)

	Level 1		Level 2		Level 3	
Airport	Demand	Share	Demand	Share	Demand	Share
San Francisco	19.9	78.7%	30.0	69.3%	31.0	55.1%
Oakland	2.6	10.1	6.0	13.9	15.0	26.6
San Jose	2.8	11.2	7.0	16.2	10.0	17.8
Buchanan Field	--	--	0.3	0.6	0.3	0.5
Total	25.3	100.0%	43.3	100.0%	56.3	100.0%

Level 1 represents the 1981 traffic level and traffic distribution among the airports. Levels 2 and 3 represent shares derived from policies in the RAP and airport master plans. Air passenger assignments for intermediate levels of Bay Area demand may be determined by interpolation between the three levels of demand shown in the table. The RAP recommends a redistribution of additional airline service to Oakland and San Jose airports--although with the changes that have occurred in airline regulation, local agencies will find it more difficult to effect such changes in airline service. Also, the plan recognizes the potential for scheduled airline jet service at smaller, community airports which have historically handled general

ABAG
ASSOCIATION OF BAY AREA GOVERNMENTS
Mailing Address: ■ P.O. Box 2050 ■ Oakland, CA 94604-2050

City & County of S.F.
Dept. of City Planning
SEP 19 1991
OFFICE OF
ENVIRONMENTAL REVIEW

September 18, 1991

Barbara Sahm
The Environmental Review Officer
City and County of San Francisco
450 McAllister Street, Sixth Floor
San Francisco, CA 94102

RE: DEIR for San Francisco International Airport Master Plan

Dear Ms. Sahm:

Thank you for sending the Draft Environmental Impact Report on the above project for our review. ABAG staff comments are directed to the DEIR's analysis of possible impacts to the jobs/housing balance, the analysis of alternatives, and the interrelationship that should exist between the San Francisco Airport and regional airport planning.

The DEIR states implementation of the SFIA Master Plan would add about 4,600 new jobs by 1996 or about 8,900 new jobs by 2006 (pg. 10). This would create a demand for 3,460 dwelling units by 1996 or 6,850 units by 2006. The DEIR projects 2,450 of these units would be in San Mateo County, 1,940 in San Francisco and 810 in Alameda County. Decision makers need to know the projected income of these employees and how housing that is affordable to them will be provided. Most airport employees cannot afford to live in San Mateo County.

Only three alternatives are analyzed in the DEIR: the no-project alternative, the on-site alternative and the off-site alternative. It would be helpful if another alternative were included that would serve more passengers than the no-project alternative but less than the Master Plan.

The DEIR points out (pg. 258) that SFIA passenger forecasts for the near-term (42.3 million annual passengers in 1996) and for the long-term (51.3 million annual passengers in 2006) exceed MTC/ABAG-recommended allocations for SFIA (27 to 31 million annual passengers in 1997). The Regional Airport Plan is currently being updated. In view of the major regional impacts of the expansion sought in the Master Plan, we recommend any decision await the development, public debate and final approval of the Regional Airport Plan. The magnitude of the proposed expansion makes conformity with the Regional Airport Plan imperative.

Thank you for the opportunity to comment on this DEIR. If you have any questions, please contact Ann Berry at 464-7919.

Sincerely,

Gary Binger
Planning Director

STATE OF CALIFORNIA - BUSINESS, TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS
1130 K STREET - 4th FLOOR
MAIL: P.O. BOX 942873
SACRAMENTO, CA 94273-0001
(916) 322-3090
TDD (916) 445-5945

City & County of S.F.
Dept. of City Planning
SEP 10 1991
OFFICE OF
ENVIRONMENTAL REVIEW

September 5, 1991

Ms. Barbara W. Sahm
City and County of San Francisco
450 McAllister Street, Sixth Floor
San Francisco, CA 94102

Dear Ms. Sahm:

The City & County of San Francisco's DEIR for the
San Francisco International Airport Master Plan; SCH #90030535

The California Department of Transportation, Division of Aeronautics, has reviewed the above-referenced document with respect to the Division's area of expertise as required by CEQA. Since no runway extension, relocations or additions are included in this proposal, the State Airport Permit for San Francisco International Airport should not be affected. We do, however, offer the following comments for your consideration.

The Division supports the proposed plans for an Automated People Mover (APM) system at San Francisco International Airport. However, we do note that it appears that with the exception of private automobile passenger drop-off, vehicles that previously proceeded directly to the terminal buildings (taxi/limo, shuttle van, shuttle bus and Sam Trans bus) would now go to the Ground Transportation Center, with the occupants then using the Automated People Mover to access the terminal buildings.

Will all curb side drop-off be discontinued for these alternative modes of travel? If so, we suggest that further consideration be given to the potential impact on the shuttle, bus and taxi/limo services if private vehicles are still allowed to drop-off passengers at the curb.

Thank you for the opportunity to review and comment on this proposal.

Sincerely,

Sandy Hesnard

SANDY HESNARD
Environmental Planner

cc: State Clearinghouse
San Francisco International Airport

2